

ALEUTIAN ISLANDS SALMON
1982 STOCK ASSESSMENT SURVEY
and
CURRENT STATUS

By
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ABSTRACT

A salmon escapement study of the Aleutian Island chain, was conducted during 1982; a record year for pink salmon abundance. The study area, nearly a 1,000 miles in length, included twenty islands. Salmon distribution and abundance was investigated for nearly every potential stream system between Unalaska and Kiska. Attu Island received an intensive ground survey of 40% of its streams. Adverse weather prevented study of Agattu Island, the only large island not surveyed. A total of 458 potential salmon streams were investigated to evaluate the potential of commercial salmon fisheries.

Pink salmon are the dominant salmon species; peak escapement counts were 3,205,957 pink, 52,420 sockeye, 2,356 chum, 1,302 coho, and no chinook salmon were observed. Survey timing was selected to best enumerate pink salmon; counts of other species were less than actual populations. The largest populations of pink and sockeye salmon occurred at Unalaska Island. The potential of a small pink salmon fishery in the vicinity of Atka Island was identified. Salmon run timing is highly variable between years, islands, and streams. Commercial salmon catches in the Aleutian Islands, primarily in the vicinity of Unalaska Island have declined considerably since 1984.

The sockeye salmon sampled were predominantly ages 2.2 and 1.3; Attu sockeye were mainly age 3.3; they averaged 512 mm in length, 2.1 kilos (4.7 pounds) in weight, and had a male to female ratio of 1.5:1. Chum salmon sampled from Atka Island were mainly age 0.3 (65%); they averaged 601 mm in length, 3.5 kilos (7.6 pounds) in weight, and had a male to female ratio of 1.5:1. The pink salmon sampled averaged 477 mm in length, 1.5 kilos (3.4 pounds) in weight, and had a sex ratio of 1.9:1. A pink salmon genetic study of 14 systems exhibited an unusually high degree of homogeneity. No high-seas salmon tags were found in a tag recovery study.

Key Words: Aleutian Islands, salmon, catch, escapement, age, length, sex

INTRODUCTION

The objective of this report is to formally document a previously unpublished 1982 report to the Alaska Board of Fisheries (ABOF). This paper presents salmon escapement information from that study and historic catch data. The range and spawning distribution of salmon observed within each system is presented in a separate publication (Alaska Department of Fish and Game 1995). This report discusses: 1) Areas for potential commercial salmon fisheries. 2) Abundance and species of salmon observed in each stream. 3) Streams with a potential for rehabilitation. 4) Salmon age, length, and weight data. 5) Pink salmon stock identification studies. 6) Recovery of salmon tagged on the high-seas.

Geography

The geology and weather that shapes the Aleutian Islands directly effects salmon distribution and abundance. Most streams are short, with steep gradients and limited salmon spawning habitat. Semi-active volcanoes are dominant geological features on several islands; streams flowing directly from volcanoes have few salmon compared to other systems. Tectonic uplifting has truncated many streams near their outlets to the ocean, resulting in waterfalls and rapids that block or reduce the passage of anadromous fish. Violent storms cause periodic stream closures by blocking stream mouths with log debris and shifting beach materials. Storms can also scour stream beds of salmon eggs during flood events.

The 1982 salmon escapement study encompassed the area west of Unimak Pass to Attu Island, a distance of roughly 1,000 miles (Holmes, 1982, Figure 1). Numerous islands of varied topography make up the Aleutian chain, ranging from mere rocky pinnacles to 70 mile long Umnak Island. Twenty islands were investigated for salmon distribution and abundance.

Background

The 1980 Alaska Legislature wished to evaluate the establishment of a separate Aleutian Islands salmon permit area to allow local residents the opportunity of a commercial salmon fishery. To meet this objective the Alaska Department of Fish and Game (ADF&G) was asked to provide salmon catch and escapement data in a joint report with the Commercial Fisheries Entry Commission (CFEC). This report lacked data for the majority of the Aleutian salmon streams (ADF&G and CFEC, 1981). In 1981, funds were allocated to conduct a two year study of the Aleutian Islands salmon resources. The majority of the field work was conducted in 1982. The high cost of the initial survey combined with the limited fisheries potential observed negated subsequent field studies of a similar scope.

Knowledge of Aleutian salmon distribution, escapement, and harvest potential prior to this study, was limited to a few islands and a small number of streams. Netsvetov (1844) reported subsistence harvest of humpy (pink) and dog (chum) salmon on Atka Island in 1833. Veniaminov (1840) noted

salmon harvests in twenty salmon streams on Unalaska Island, the most important in order of abundance were: Makushin Lakes (Volcano Bay), red (sockeye) salmon; Nateekin River, pink salmon; McLee's Lake, sockeye salmon; and Kashega Lake, sockeye and pink salmon. Veniaminov also reported nine salmon streams on Umnak Island, five on the north and four on the south end of the island. Atkinson (1955) provided a brief review of the early commercial salmon fisheries in the Aleutian Islands. Willimovski (1963) reported the distribution of salmon by species and island, but not by stream. Hanamura (1967) identified 28 salmon systems on Unalaska, Umnak, Arnika, and Attu Islands. Seimenstad, Isakson, and Nakatani (1977) presented a brief historical review of fisheries studies in the Aleutians. Valdez, Helm, and Neuhold (1977) reported the limited abundance of pink salmon in 21 streams, coho salmon in five streams, and sockeye in one pond on Amchitka Island. Glen Davenport (ADF&G) conducted an incomplete aerial survey of nine of the islands in 1967 using a DC3; during 1979 he estimated escapements in a few streams on Attu, Agattu, Amchitka, and the Andreanof Islands based on personal interviews (ADF&G, Cold Bay, personal communication). In spite of occasional explorations by fishing vessels to Umnak Island and one venture to Attu Island in 1963 the commercial fishery never expanded west of Unalaska Island.

Prior to the 1982 survey, the Department had cataloged 444 anadromous streams in the Aleutian Islands. The majority of these streams had been designated anadromous based on topographical maps and personal interviews. A total of 105 of these streams were listed for Unalaska Island and eastward. Little was known about the 339 potential streams listed from Umnak to Attu Island.

METHODS

Study Areas and Logistics

The study team comprised two units. The primary survey team was based aboard the 100 foot long *RV Alaska* conducted aerial and ground surveys from Unalaska Island to Kiska Island during a 51 day charter from August to mid-September. The primary team included: four biologists, two from ADF&G, Kodiak, and two from the University of Washington (UW) Fisheries Research Institute (FRI); a helicopter pilot/mechanic (Trans-Alaska Helicopters); and the UW vessel crew of four.

Attu Island's geographic isolation and potential to be the most productive island in the western Aleutians merited a second team. During May and June of 1982 reconnaissance trips were conducted by the author in a United States Coast Guard (USCG) C130 to examine topographic features of the island, the morphology of the streams, photograph potential salmon streams, determine logistical needs and the feasibility of ground investigations. A field crew of two biologists conducted foot surveys at Attu Island over a 54 day period from late July until September 10. They were equipped with three wheel ATV's and a raft. Logistical support for this project was supplied by the U.S. Coast Guard Loran Station. Transportation of personnel and equipment was provided by the U.S. Coast Guard Air Station Kodiak C-130 aircraft in late July. One biologist arrived on a commercial flight in early August.

The RV *ALASKA* was equipped with a helicopter landing pad on loan from Kodiak King Crab Incorporated. A chartered Bell Jet Ranger helicopter was used to deploy field crews and to conduct aerial stream surveys. The vessel acted as mobile operations base. A 16 foot Zodiac raft and Boston Whaler were used to transport staff ashore for foot surveys during weather too inclement for helicopter operations.

Streams on the north and west sides of Unalaska Island were also surveyed by the Alaska Peninsula/Aleutian Islands Area biologists. Annual stream surveys of Unalaska Island were flown with a Grumman Goose based out of Dutch Harbor in August and early September. This study surveyed additional areas of Unalaska Island which previously had received little or no assessment effort, including Beaver Inlet, the south side, and the southwest panhandle of the island and west of Skan Bay, (Shaul et al. 1983).

Escapement Enumeration

The primary objective of the aerial stream surveys was to enumerate pink salmon abundance and distribution. As a result, sockeye and coho salmon were not always enumerated at periods of peak abundance. In this report peak counts are expanded to estimate the total escapement (Table 1). Counts were not expanded in earlier unpublished reports of this study or for USFWS surveys cited for Adak (Table 2). Peak counts reflect the highest number of fish counted on a particular day during the season, not necessarily the total. Cousens et al. (1982) reported that aerial and foot surveys for salmon often underestimate the true number of salmon by not enumerating the entire population over time. Total estimates were based on the expansion of peak aerial and foot surveys counts. An expansion factor of 2.0 was applied to the sockeye counts (Barrett et al. 1984). An expansion factor of 2.4, based on data presented by Minard (1986), was applied to coho estimates. Pink and chum total escapements were estimated using expansion factors of 1.85 and 1.75. The expansion factor for pink salmon was calculated by using the ratio of peak counts to the estimated total of pink salmon on Unalaska Island for 1985, 1988, and 1990 (McCullough, 1986, 1989, and Shaul, et al., 1991). The expansion factor for chum salmon was based on southern Alaska Peninsula chum estimates (Shaul, et al. 1991). The estimated total pink and chum escapements for these reports were based on Johnson's and Barrett's (1988) method which applies a geometric approach to estimating total escapement based on an assumed stream-life estimate of 15 days. Expanded estimates of total escapement provide the best approximation of escapement based on limited survey data.

Cataloging Streams, Definition of Spawning Area

Prior to 1982, most Aleutian Island streams were cataloged based on topographic maps and interviews rather than direct observations by ADF&G personnel. During this study species distribution, spawning and potential rearing areas were documented for these systems. Stream morphology information was recorded for each stream including: average stream width and depth, gradient, channel type, predominant bottom type, stream blockages to fish passage, and

predominant bank vegetation. This information is on file with the ADF&G Habitat Division in Anchorage.

Escapement Sampling

Sample Sizes and Methods

Sample sizes for age, length, and sex determination were not based on statistical evaluation but on time availability and logistic considerations. Marginal flying weather for deployment of the ground crew limited the sample sizes in most cases to only 50 fish per species. Sockeye and chum salmon were sampled when it was believed that sampling would not harm the escapement. A minimum of 50 pink salmon were sampled from each major island for length, weight and genetic tissue samples. No coho or chinook salmon were sampled due to a lack of abundance of those species. Sampling was conducted with dip nets, fish spears, and in a few locations a small mesh gillnet. A minnow seine and minnow traps were used on Attu Island to determine the presence of juvenile salmonids.

Size and Sex Determination

The majority of the sampled fish were sexed and measured for length (mid-eye to fork-of-tail). Lengths were taken using a caliper and were accurate within 0.5 mm. Weights were taken to the nearest 0.1 kg. Sex was determined from morphological examination. Weights from the commercial catch at Unalaska Island and the Alaska Peninsula were based on fish ticket summaries compiled by the Alaska Department of Fish and Game, Division of Commercial Fisheries. Southern Alaska Peninsula districts salmon weights were based on fisheries during July and August. Scales were taken from the preferred area for age determination (INPFC 1963; Moser 1968). Otoliths were also taken for age determination (Kim 1968).

Age Determination

Otoliths or scales were taken from sockeye and chum salmon for age determination when fish were encountered in numbers to sample (Mosher 1968, Kim 1968). Scales obtained from the preferred area of each sampled fish were mounted on gum cards and impressed on cellulose acetate using methods described by Clutter and Whitesel (1956). Scale impressions on acetate cards were aged using a standard microfiche viewer. Otoliths were extracted from the sinus adjacent to the brain and stored in numbered trays. Ages were recorded in European notation (e.g., 1.3). In this notation the first digit is the number of freshwater annuli and the second digit, following the period, is the number of marine annuli. The total age is the sum of these digits plus one for the year preceding scale development.

Pink Salmon Stock Identification Studies

Adult pink salmon were sampled for genetic analysis from 13 streams on 11 islands: (1) Peaceful River, Attu Island; (2) North Harbor Creek, Kiska Island; (3) two samples from Fenner Creek,

Semisopochnoi Island; (4) Cable Bay and Twin Bay Creeks on Tanaga Island; (5) Stream 307-16-50, Kanaga Island; (6) Finger Bay Creek, Adak Island; (7) Quail Bay Creek, Kagalaska Island; (8) Blue Fox Bay and Korovin Bay Creeks, Atka Island; (9) Chalugas Bay Creek, Amlia Island; (10) Sheep Creek, Umnak Island; and (11) Nateekin River on Unalaska Island. The samples were compared with fish from Norton Sound, Bristol Bay, and Kodiak Island. Eye, brain, liver, heart, and skeletal tissues were obtained from 50 individual fish by severing the head anterior to the pelvic girdle. Samples were frozen and stored at -20°C until the tissues could be analyzed in the laboratory at the University of Alaska, Juneau. Further details on analytical methodology are presented in Gharrett, et al. (1985).

Commercial Catch Compilation

Catch information from 1911 through 1959 was compiled by United States Bureau of Commercial Fisheries. Catch data (after 1959) presented in this report were compiled by the Division of Commercial Fisheries, Alaska Department of Fish and Game. Data in this report may differ slightly from earlier publications because of more recent editing. Catch information presented was published in Holmes and Shaul, (1996; Tables 3 and 4).

RESULTS AND DISCUSSION

Escapement Enumeration

The 1982 study evaluated the potential for additional commercial salmon fisheries in the Aleutian Island Chain. Islands with the highest potential for commercial harvest were examined on a prioritized basis. Salmon enumeration, the primary objective of this study, was carried out for nearly every potential stream system between Unalaska and Kiska. The exceptions were: one lake on Tanaga Island, the Islands of Four Mountains, the northern Rat Islands (Figure 1a-1c) and Agattu Island. Averse weather conditions delayed the *RV Alaska's* arrival at Kiska resulted in canceling helicopter surveys of Attu and Agattu Islands. Flying hours during this study were often restricted by severe weather, which reduced the study team's ability to achieve all of its objectives. Small streams and lakes on Shemya Island were examined on foot in 1982 and 1983; two streams, the outlets to Lower and Laundry Lakes, were found connecting with the sea. Attu Island received an intense foot survey effort but the rugged topography of the island restricted the study to approximately 40% of the streams on the island. A total of 458 potential salmon streams were investigated (Appendices A.1-13).

The timing of this study was focused on obtaining the best data on pink salmon, the dominant species in the Aleutians (Tables 1, 2, 3 and 4; Figures 2 and 3). It was not possible to equally assess the escapement of each species of salmon. The study may have been too late to accurately assess early runs of sockeye and chum salmon. By September coho salmon were just beginning to enter fresh water; high winds and water turbulence made it nearly impossible to count coho salmon

schooling in saltwater. The additional time required to adequately assess coho salmon escapements would not have been cost effective due to delays from the increasing severity of the fall weather.

Counts of species other than pink salmon were under estimates of the actual stock size. However, extensive examination of potential habitat for these species indicated that their actual numbers were probably small on most islands.

Limited surveys have also been conducted by United States Fish and Wildlife Service (USFWS) since 1982. Juvenile salmon were surveyed on eight islands in the central and eastern Aleutians during 1987, 1988, 1989 (Palmer, USFWS, Kenai, personal communication). These surveys were too early in the season to adequately enumerate adult salmon (Dave Somerville, USFWS, Kenai, personal communication). Palmer (1995) reported on Adak Island adult and juvenile salmon abundance and distribution studies conducted during 1993 and 1994.

Escapements

The estimated total Aleutian Island salmon escapement for 1982 included: 5,931,020 pink, 104,840 sockeye, 4,123 chum, and 2,279 coho (Table 1, Figures 2, 3 and 4). Peak escapement counts were 3,205,957 pink, 52,420 sockeye, 2,356 chum, and 1,302 coho. The estimates of total escapement are not absolute numbers but provide the best approximation of escapement based on limited survey data.

The largest runs of pink, sockeye and probably coho salmon occur on Unalaska Island. The largest chum salmon run was on Atka Island.

Pink salmon returns are usually larger during even-years, (Table 2, 3 and 4; Palmer (1995); "Spike" Zaochney, Atka; Walter Diakanof, Unalaska; personal communication). Pink salmon run strength is highly variable between years, islands and streams. This variability may be a function of: stream scouring by violent storms, blockages of the stream mouths with debris, or possible variations in fresh water and marine survival.

There are no known chinook (king) salmon runs in the Aleutian Management Area. No large lake/river systems exist to provide adequate spawning and rearing habitat for chinook (king) salmon. Veltre and Veltre (1983) reported "While it is not definite, some Atka residents say that a few king salmon spawn in one of the streams emptying into the north shore of Nazan Bay". No chinook have been observed in those streams in recent years (Mark Snigaroff, Atka Fishermen's Association, Atka, personal communication). Vincent Golembeski observed one "lost" male King salmon in Army Dock Creek, on Atka island in 1994. (ADF&G, personal communication). Ken Griffin reported the catch of two chinook in Unalaska Bay streams (ADF&G, Dutch Harbor, personal communication). The small number of king salmon harvested in the Aleutians are probably migrating "feeder kings"; a few individuals may occasionally stray into the larger streams.

Cataloging Streams, Definition of Spawning Area

During this study an additional 176 systems were found to have anadromous fish populations (ADF&G 1974, 1983). The species composition and distribution of spawners was documented for a total of 458 streams. This information had not been previously documented for the majority of these systems (Appendices A.1-13, Appendices B.1-11). The results of this study component are published in (ADF&G, 1995). Stream morphology information was recorded for each stream including: average stream width and depth, gradient, channel type, predominant bottom type, stream blockages to fish passage, and predominant bank vegetation. This information is on file at the Habitat Division Regional Office in Anchorage. An additional seven streams for Agattu Island (1989) and 19 systems for Adak Island (1993 and 1994) were identified as anadromous systems by the USFWS.

Stream Rehabilitation

Twenty of the 458 streams surveyed would have increased salmon productivity if debris were removed or fish ladders installed (Appendices A.1-13, B.1-13). Seven systems on Unalaska Island might be cost effective and worthy of further evaluation; a sockeye run could be initiated with the installation of a fish pass in Udgmatt Cove River. Umnak Island salmon production could be improved with: sockeye enhancement of Nikolski Village Lakes and fishpasses for pink and coho salmon at Amos Cove and Okee Bay. Atka Island salmon runs could be increased by sockeye enhancement for Korovin Lake and stream 305-32-260, and a fishpass for pinks and sockeye for the stream between Banner and Deep Bays. Adak Island's sockeye production could be improved by: maintaining a permanent outlet to Lake Andrew and Lake Constance. Replacing the falls with resting pools at the outlet to Quail Bay (Kagalaska) Lakes would increase sockeye escapement. On Attu Island culverts should be maintained and concrete debris be removed from the Peaceful River. Shemya Air Force Station would benefit from establishing (or reintroducing) a pink salmon run by using an incubator box in the outlet of Lower Lake.

Some stream rehabilitation can be done by local residents or fishermen with support from other agencies. A good example of local projects was a small stream under a road at Atka where a "hanging culvert" that obstructed fish passage. Local residents maintained coho and pink salmon escapements by carrying fish from saltwater in buckets. The author obtained surplus sections of steep-pass from ADF&G in Kodiak. The sections were flown to Adak by the USCG Air Station, Kodiak. Peninsula Airways flew it from Adak to Atka village at no charge. The fish-pass was assembled and installed by the villagers in 1983. The fish pass is presently assisting the migration of salmon into the small stream. Atka Public Works Department installs it each summer and removes it before the winter storms.

Escapement Sampling

Age Composition

Age composition varied considerably between islands as did sample sizes. Sockeye salmon from Unalaska in the eastern Aleutians were mostly (88%) 5-year-olds, age 1.3 (Table 5). In the central Aleutians 50% of the Atka sockeye were 4-years-olds, age 1.2 and 40% were 5 years of age, ages 1.3 and 2.2; Kagalaska and Adak sockeye were mainly 5-year-olds, age 2.2. In the western Aleutians fish sampled at Attu were predominantly (83%), 7-year-olds, age 3.3; it also had a surprising number of 4.3's, a seldom observed age class. Chum salmon from Atka were mainly (65%) 4 years of age, age 0.3. Pink and coho salmon were not sampled for age composition.

Length Composition

The weighted mean lengths of salmon sampled during 1982 were: 461 mm for pink, 512 mm for sockeye, and 601 mm for chum salmon (Table 6). The longest (491 mm) pink salmon sampled occurred in stream 307-16-280 on Tanaga Island. The longest sockeye (523mm) occurred in Hidden Bay Lake on Adak Island. Chum salmon were only sampled from a stream (305-42-290) flowing into Koroviniski ("Old Harbor") Lagoon on Atka Island averaged 601 mm. Palmer(1995) reported Adak salmon lengths ranged from 425-580 mm for sockeye, 230-645 mm for coho, 400-530 mm for pink, and 605 mm for one chum salmon.

Sex Composition

The weighted average male to female ratios of the salmon sampled were: 1.9:1 for pink salmon, 1.5:1 for sockeye, and 1.5:1 for chum salmon. These ratios may have been biased toward males by selectivity of the sampling methods and run timing.

Weight Composition

Salmon weight information is summarized by species in Table 6; this data should not be interpreted as being maximum weights. The project attempted to sample the brightest individuals in at least one major system on each island surveyed. Fish were sampled in late August and early September.

Run timing made it necessary to sample fish which had been in freshwater for varying lengths of time, some had been in fresh water for up to two weeks. Fish sampled on the spawning grounds weigh less than sea-run fish. There was an unintentional sexual bias in sampling which was reflected in average weights and possibly length data. This data should be used for relative comparisons.

Pink salmon sampled in this study averaged 3.4 pounds (1.6 kg) (Table 6). The largest pink salmon encountered were from Atka Island, averaging 4.24 pounds (1.9 kg). During 1982, commercially caught pink salmon at Unalaska Island averaged 3.3 pounds (1.5 kg), while fish in the South (Alaska) Peninsula fishery averaged 3.5 pounds (1.6 kg) (A. Shaul, ADF&G, Cold Bay, personal communication).

Aleutian Islands sockeye salmon in the escapements averaged 4.7 pounds (2.1 kg), compared to a 4.9 pound (2.2 kg) average in the commercial fishery in the Unalaska Island District and 6.4 pounds (2.9 kg) in the South Peninsula fisheries (A. Shaul, ADF&G, Cold Bay, personal communication). The sockeye salmon were all spawning, except on the Kagalaska Island where bright fish weighed an average of 4.4 pounds (2.0 kg). The falls at the outlet of Quail Bay Lake may be selective for smaller fish. The heaviest fish, averaging 5.3 pounds (2.4 kg), were sampled at Adak Island where they were actively spawning. USFWS surveys in 1987 noted average sockeye weights of 5.2 pounds (2.3 kg) for bright fish from the same area (Mary Faurot, USFWS, Kenai, personal communication).

Only three chum systems of any significance were located during the study. The largest return (1,350 salmon) was on Atka Island, where actively spawning fish averaged 7.6 pounds (3.5 kg). "Bright" chum salmon in the commercial catch averaged 8.4 pounds (3.8 kg) at Unalaska and 7.9 pounds (3.6 kg) in the South (Alaska) Peninsula fisheries during 1982 (A. Shaul, ADF&G, Cold Bay, personal communication).

Run Timing

Salmon run timing is highly variable throughout the Aleutian Chain. It may vary, between years, up to three weeks for an individual species. Unalaska residents reported that sockeye salmon return to Unalaska by early-May, peaking by the end of June or early July; a few continue to return into August. McLee's Lake sockeye probably peak between the 1st and 10th of July. Sockeye systems on the south side of the island probably peak in late July (late run fish were observed by the author during 1982 at Kashbega Lakes in mid-August and mid-September in Volcano Bay and McLee's Lakes). Pink salmon return from early-July to late-August, peaking in early to mid-August. A few chum salmon return from June to September, peaking in mid-August. Coho salmon return from mid-August to early-November, peaking in late-September (Ken Griffin, ADF&G, Dutch Harbor; Arnold Shaul, ADF&G, Cold Bay, personal communications). Pink salmon run timing is usually earlier in strong run years with some fish in Unalaska Bay by July 4th (Emil Berikoff, Unalaska, personal communication).

Nikolski residents (Umnak Island) have observed that sockeye salmon return in June and July, peak in late June. Pink and chum salmon return during July and August and peak in mid-August. Coho salmon return from mid-August through October and peak in mid-September (Father Tim Perry, Unalaska, personal communication).

Atka residents report that chinook salmon are caught with sport gear in Nazan Bay during April, May, September, and again in December and January. Sockeye salmon return mid-May to Mid-September, peaking in June and again in September, the early run is the largest. Pink salmon return from late-July to end of August, peaking the third week of August. Chum salmon follow a little later than pink salmon; coho salmon return from mid-August to mid-October, peaking in mid-September. Run timing can vary two weeks or more between years (Nick Nevzoroff, "Spike" Zaichney, Atka, personal communication).

Vern "Pops" Higginson, a civil service employee at Shemya AFS, and long time sport-fisherman at Attu reported that pink salmon escapements at Attu are quite variable, ranging from late-July to September. Pink salmon usually peak in mid-August, however in 1978 they did not enter the Peaceful River until early-September. He also observed a few coho in that stream during September. Leslie Watson and Nell Murray (ADF&G, Kodiak, personal communication) observed three coho salmon in the Henderson River in mid October during 1982.

Incidence of High Seas Tagged Salmon

No tagged salmon were observed in any stream during the 1982 field study. The lack of tagged salmon may have been a function the small number of streams (47) surveyed by foot, species run timing in relation to the surveys, or simply the small number of salmon returning to the Aleutians compared with other regions in the North Pacific.

Pink Salmon Stock Identification Studies

Gharrett, et al. (1988) compared the genetic relationships of the pink salmon sampled during the 1982 Aleutian survey with even-year pink salmon from Norton Sound, Bristol Bay, and Kodiak Island. No significant heterogeneity (difference in genetic composition) was observed among the Aleutian Islands samples. The Aleutian Island populations were more closely related to Bering Sea stocks than to the Kodiak Island stocks. They were more closely related to North American (Bristol Bay) stocks than to Asian pink salmon (Sakhalin Island, USSR).

The homogeneity (similarity in genetic composition) among the Aleutian Island pink salmon stocks is important, because the samples were taken over a range of nearly 1,000 miles (Gharrett, et al. 1988). McGregor (1982) reported that pink salmon populations exhibit more genetic divergence over less distance in Southeastern Alaska.

The author proposed in Gharrett et al. (1988) that frequent straying between individual populations may preclude genetic divergence of Aleutian stocks. Aleutian pink salmon may undertake a more difficult search pattern than mainland fish. Many Aleutian streams may have too small a discharge to present a strong olfactory clue to the returning fish. Salmon cannot simply follow a shoreline to their natal stream when they encounter land, unless they happen to reach their home island. Increased straying may also result from periodic stream closures caused by violent storms blocking stream mouths with logs or shifting beach material..

Escapement Observations by Island

Akutan Island

The Akutan Harbor stream was the only stream surveyed in the Krenitzin Islands (Table 1, Appendices A.1, B.1). Akutan Harbor Creek was the only stream with a previously documented

run of pink salmon. In 1982, 9,000 live and 1,500 dead pink salmon were observed in a foot survey in this system. Aerial surveys of the Island were deferred for higher priority streams on Unalaska Island (Table 1, Appendices A.2,B.1) and the low potential for salmon in adjacent creeks (exhibited by the lack of commercial fishing, stream topography, and staff observations).

Unalaska Island

Unalaska Island produces the largest known number of salmon in the Aleutian Island Archipelago. There is little potential of a local stock commercial fishery of a similar magnitude anywhere else in the Aleutians (Table 1, Appendices A.1, B.2). Several good to excellent pink runs were observed in 1982, on the southwestern panhandle from McIver Bight to Surveyor Bay, at Final Bay in Beaver Inlet, and Tanaskan Bay (Appendix B.2). Kashega Lakes had the largest (24,000 fish) sockeye return in the Aleutian Island west of Uria Bay on Unimak Island. Nateekin River had the largest pink salmon escapement of 243,000 fish. Most streams outside of Unalaska and Makushin Bays have been relatively unexploited by commercial fishing.

Streams on the northwest flank of Makushin Volcano are too steep to sustain salmon. Most escapements in Beaver Inlet were generally small, except for Final Bay, ranging up to a few thousand pink salmon. Small numbers of pink and sockeye salmon occur on the southeast portion of the island. Riding Cove Creek was the only stream on the Pacific side of the panhandle from Kuliliak Bay to Surveyor Bay with more than 5,000 pink salmon. No large chum runs were noted on the island.

Pink salmon sampled in Nateekin River averaged 3.3 pounds (1.5kg), were 465 mm in length and had a male to female ratio of 0.9:1 (Table 6). The majority (87%) of the sampled sockeye salmon were age 1.3 (Table 5). These fish averaged 5.5 pounds (2.5kg) in weight, 524 mm in length, and had a male to female ratio of 1.2:1.

Unalaska Island has historically produced the largest commercial catch of salmon in the Aleutian Islands. Usually the greatest harvest occurs in even years when a million or more pink salmon could be harvested during a good season. Unfortunately, pink catches declined after 1984. The even-year harvest for 1986-1996 averaged 270,735 pink salmon ("0" harvest in 1996). The only substantial odd year harvests on record were in 1927, 1969, 1979, and 1981. The pink catch has been disappointing since 1985. The only odd year harvest since 1985 was 6,700 pink salmon in 1989 (Table 3).

Salmon runs at Unalaska Island have declined since the mid to late 1980's, during a period of increasing returns for most of the Gulf of Alaska. The exact cause of the dramatic run collapses at Unalaska are not known. Part of the decline may be due to fluctuations in marine survival (Arnold Shaul, ADF&G, Cold Bay, personal communication). The author speculates that scouring of the stream beds by violent floods may be a factor in reduced runs in some stream systems. Returns of pink salmon in Unalaska Island streams were excellent in 1982 and 1984. However, since the storms during the winter of 1984-85, returns to several systems have been weaker than expected. The stock of sockeye which used to spawn in the inlet stream to Unalaska Lake was essentially eliminated after that flood (Ken Griffin, ADF&G, Juneau, personal communication). Scouring may

also have been responsible for the lack of strong odd year returns in Captain's Bay since 1981 (Arnold Shaul, ADF&G, Cold Bay, personal communication). The poor return of pink salmon to larger systems on Unalaska in 1996 was probably the result of stream scouring during storms in the winter of 1994-95 (Robert "Skip" Gish, ADF&G, Dutch Harbor, personal communication).

The decline in the market for frozen pinks has also contributed to the reduced salmon harvest at Unalaska. No local processors have purchased pink salmon since 1988. Occasionally pinks were tendered to King Cove, 1994 was the last year a floating processor bought pink salmon (Holmes and Shaul, 1996). No harvest occurred in 1995 or 1996.

Adverse weather limited Unalaska escapement surveys in 1996 to a few streams and the return of pink salmon to those streams was late and very weak. Unalaska Lake sockeye escapements continue to be very weak. A pink harvest of approximately 1,000,000 was projected for 1996; however, no fishery occurred due to low fish abundance, low prices, and lack of processor interest. No commercial fishery is expected for 1997 or 1998 because of poor parent year escapements.

Umnak Island

The northern half of Umnak has very few salmon streams (Table 1, Appendix A.2, B.3). Several of the streams appeared to provide good aquatic habitat but little or no salmon, dolly varden, or stickleback were observed! Water temperatures were well within the desired range for salmon, most streams were spring-fed and open to the mouth at salt water. Stream gradients were acceptable, vegetation was present in the stream beds, and the water was essentially clear with no foul odor or taste. It appeared that some factor associated with the spring-fed drainage from the Okmok Volcano restricts fish from these streams. Only two streams on the northeast end of the island had any significant numbers of salmon and both were runoff streams and not spring-fed streams. Unfortunately the survey party had no means to check the chemical or dissolved gas composition of the water.

The majority of the salmon streams are located on the southern half of the island in Russian, Amos, Driftwood, Okee, and Inanudak Bays. Pink salmon sampled on Umnak averaged 3.9 pounds (1.8kg) in weight, 458 mm in length, and had a male to female ratio of 7.3:1 at the time of sampling (Table 6). This unusual ratio was the result of using a gillnet to capture the fish, the males were more easily entangled in the net. No sockeye salmon were sampled because the only escapement of any size was the Nikolski Village Lakes. A good count of sockeye salmon in this system was not possible and we did not wish to jeopardize the spawning potential of the few fish observed. This small lake would benefit from an enhancement program to increase the return of sockeye salmon.

The streams in Nikolski Bay and Sandy Beach areas have relatively small numbers of pink, sockeye, and coho salmon. These streams have been historically utilized for subsistence by residents of Nikolski Village, the oldest continuously inhabited village in Alaska. The runs in the vicinity of the village could easily be jeopardized by a commercial fishery. These streams would have little or no commercial value during most years.

Amlia Island

The majority of Amlia Island has very poor salmon streams (Table 1). The steep topography, small drainages and exposed stream mouths create short streams with marginal salmon habitat (Appendices A.3,B.4). The most productive salmon systems are on the northwest side of the island, about 20 miles east of United States Geological Service (USGS) marker "Round" 290 (vicinity of Hungry Bay). The escapement counts for these streams averaged 7,620 pink salmon, and the peak stream count was 12,500 fish. Only two streams on the south side of the island have the potential for a small harvest. Stream 305-21-40 is an important coho salmon stream for subsistence users from Atka. Salmon escapements in other than peak years for pink salmon are probably insignificant.

Small numbers of sockeye and chum were observed on Amlia Island but no fish were sampled. None of these runs would be expected to support commercial fishery. Pink salmon sampled were considerably smaller than on Atka, averaging 3.1 pounds (1.4kg), with an average length of 449 mm, and a male to female ratio of 0.7:1 (Table 6).

Atka Island

Atka Island has the greatest potential for development of a salmon fishery west of Unalaska Island (Table 1, Figure 2). There are several moderate to good pink salmon streams located on the south side of the island from Explorer Bay to Cape Utag, and on the north/central portion of the island from Blue Fox Bay to Korovinski (Old Harbor)Lagoon (Appendices A.4, B.5). The northern-most stream in Korovinski Lagoon had an escapement of 86,000 to 100,000 pink salmon. This was one of the best pink salmon systems west of Unalaska Island. A total of 578,083 pink salmon were observed in the streams and the estimated total pink escapement was over one million fish (Table 1). A potential harvest of up to 300,000 pink salmon might be achieved from Atka Island during a season of similar run magnitude as 1982 (A. Shaul, ADF&G, Cold Bay, personal communication). Research conducted by the author from 1992 to 1996 leads him to believe that the escapements observed in 1982 were unusually high.

Atka also had the largest sockeye salmon escapement observed west of Unalaska, in 1982. A total of 2,500 fish was located in the west arm of Deep Bay. The largest number of chum salmon (1,350) in the Aleutians was observed in stream 305-32-270.

Several streams other than those noted in Appendix A.5 were reported to have sockeye and coho salmon. This study may have either been too early to index these streams or the escapements may have been weak for those species in 1982. The number of sockeye salmon in Korovin Lake was less than expected given the size of the lake. This may have been a function of timing of the survey, reduced visibility, or simply a poor run.

There was a loss of sockeye spawning and rearing area around Korovin Lake in 1982 when the water level in the lake dropped. This was the result of deepening of the lake's outlet to allow skiff access from Korovin Bay. This activity probably reduced the size of the sockeye run by the late 1980's. Unfortunately there is little escapement information for this lake.

Even though the largest numbers of sockeye, chum, and coho salmon west of Unalaska occurred at Atka, these small stocks would not be expected to support a directed commercial effort. They would only be harvested incidentally to pink salmon. However, these small runs, particularly sockeye are very important to the community for local subsistence (Larry Dirks, personal communication, Atka). Adequate provisions should be made to avoid over-harvesting these small stocks if a commercial fishery develops.

Pink salmon sampled at Atka were the largest in the Aleutians weighing an average of 4.2 pounds (1.9kg) from a sample of bright fish from Koroviniski Lagoon (Old Harbor) (Table 6). A sample of pink salmon taken in Kovurof Bay, though thin and nearly spawned out, still averaged 3.4 pounds (1.6kg). Atka pink salmon averaged 452 mm in length and had a male to female ratio of 4.8:1 (Table 6). Chums sampled at Koroviniski Lagoon averaged 7.6 pounds (3.5kg) in weight, 601 mm in length, and had a male to female ratio of 1.5:1. They were actively spawning and had obviously lost weight. Sockeye salmon sampled from a multiple lake systems east of Wall Bay averaged 3.4 pounds (1.6kg) in weight, 481 mm in length, and had a male to female ratio of 0.7:1 (Table 6). Half of the fish sampled were age 1.2. These fish were colored and spawning, and were shorter than sockeye salmon in the rest of the chain.

Although there was little potential for a major commercial fishery west of Unalaska, it was determined that there were enough pink salmon to support development of a small scale fishery at Atka Island. Based on the escapement data gathered in this study the community of Atka petitioned ADF&G and CFEC for a fishery near their island (unpublished ADF&G and CFEC report to the Sixteenth Alaska Legislature 1990). In 1991, the Alaska Board of Fisheries and the Commercial Fisheries Entry Commission, approved a new, open to entry, set gillnet fishery for pink salmon near Atka and Amlia Islands).

The Atka/Amlia pink salmon fishery has been open since 1992. The development of the fishery, commercial and subsistence catches, and escapement data are documented in Holmes (1995). Commercial fisheries regulations for this fishery are outlined in ADF&G 1996. The largest catch to date was 8,553 salmon in 1992, unfortunately, the processor operating the local fish plant never paid the fishermen for their catch. Since 1992, the harvests have averaged less than 400 fish, all has been used locally for bait or subsistence (Table 4). To date the Atka-Amlia pink salmon fishery has not been a success due to low abundance during "odd" years and a continued lack of a pink salmon market. In recent years, fishermen have focused their efforts on the more lucrative halibut fishery.

Eastern Andreanof Islands

This group of islands is located east of Adak and west of Atka (Appendix B.6). They include Igitkin, Tagulak, Chugul, Umak, Little Tanaga, Great Sitkin and Kagalaska Islands. Only Great Sitkin and Kagalaska Islands had pink salmon escapements which exceeded 1,000 fish (Table 1, Appendix A.6.). Quail Bay on Kagalaska was sampled for both pink and sockeye salmon. Pink salmon, which were at least two weeks past their peak, averaged 2.9 pounds (1.3kg) in weight, 491 mm in length, and had a male to female ratio of 0.9:1 (Table 6). Sockeye salmon were "ocean bright" and weighed only 4.4 pounds (2kg), averaged 508 mm in length, and had a male to female

ratio of 0.8:1 (Table 6). A four foot high falls at the lake outlet restricted the number of fish that were able to enter the lake. The escapements into the lake would be greatly improved if the escarpment was broken into resting pools. The majority of these salmon (57%) were age 2.2. The Galas Point system was reported to have coho, pink, and sockeye salmon, however, only 275 sockeye salmon were observed.

Adak Island

Adak Island is third in terms of salmon potential after Unalaska and Atka Islands (Table 1). (Attu Island might be a possible exception but it was not completely surveyed.). The major streams are located on the north end of the island (Appendices A.5, B.6). Four of the five major streams are on the U.S. Naval Station, a secured military facility. The fifth in Gannet Cove is the southern boundary of the facility. These five streams account for the majority of the salmon on the island, they each averaged 53,000 pink salmon. Sockeye salmon runs peak in July, pink salmon runs usually peak in late August; and coho escapement peaks in mid- to late-September.

Pink salmon escapements on Adak have been generally increasing since they were first monitored at Finger Bay Creek by the USFWS in 1977, unfortunately this stream has not been surveyed every year (Table 2). It could be a valuable index stream to gauge escapements in the central Aleutians.

Finger Bay stream had the largest (100,000 fish) run of pink salmon on the island in 1982. This stream has only 5/8 mile of spawning area below a series of waterfalls. Fish sampled from this stream weighed 3.5 pounds (1.6kg), had an average length of 491 mm, and a male to female ratio of 0.6:1. These fish had been in freshwater approximately one week. The north stream in Hidden Bay has the only significant number of pink salmon (7,700) on the south side of the island, and the only run of sockeye salmon (821) of consequence. A sample of these actively spawning sockeye salmon averaged 5.3 pounds (2.4kg) in weight, 523 mm in length, and had a male to female ratio of 2.3:1 (Table 6). These fish, like those at Kagalaska, were primarily composed of 2.2 age class (54%; Table 5). The kokanee (land-locked sockeye salmon) population in Lake Andrew was not sampled.

Palmer, USFWS, (1994) conducted extensive salmon distribution and abundance research on Adak Island in 1992 and 1993. His research paper lists 19 additional anadromous salmon streams in Adak Island and noted (as in this study) that Finger Bay supported the largest single run of pink salmon on the island. Palmer reported that Lake Andrew is now open to the sea and supports both sockeye and coho salmon. The author concurs with Palmer's speculation that 1982 was an unusually abundant year for pink salmon.

There are only a few streams on Adak Island which have the potential for a harvest during peak years. With one exception these streams are on the U.S. Naval Station. Restricted access to the base has precluded development of a commercial fishery. The closure of the Naval facility and the potential development of a fisheries support center at Adak could allow for the commercial harvest of pink salmon from Adak, Kagalaska, and Atka Islands if markets improve.

Kanaga Island

Kanaga Island, for its size, is one of the poorest salmon producing islands in the Aleutians (Table 1). It has minimal salmon habitat, most of the streams terminate in waterfalls at the ocean shore line, possibly the result of tectonic uplifting. Only three systems on the island produce an appreciable number of pink salmon. The largest pink run of 12,700 fish occurred in Kanaga Bay (Appendices A.6, B.7). A sample of spawned out pink salmon weighed an average of 2.3 pounds, with an average length of 481 mm, and a male to female ratio of 1.8:1 (Table 6). The weights should not be used for comparative purposes because they were taken from spawned-out fish. Pink salmon spawning on Kanaga probably peaked during the second week in August. The lake and stream in Chum Bay, #307-16-240, were not surveyed due to high winds. The steep topography at this end of the island may have blocked salmon access to that stream. Inclement weather prevented re-examination of this system.

Tanaga Island

Tanaga, like Kanaga, is also very unproductive for its size (Table 1). Many of the streams were blocked by debris or tectonic uplift. Nearly 85% of the pink salmon on the island were located in two streams. Stream 307-23-90 in Tanaga Bay had the largest escapement, nearly 40,000 pink salmon (Appendices A.8, B.7).

Bright pink salmon from streams in Twin and Cable Bays weighed an average of 3.6 pounds, their average length was 466 mm and their male to female ratio was 1.7:1 (Table 6). Run timing was about two weeks later in Twin Bays and the fish were in better condition. The majority of the island's escapements appeared to have peaked during the second or third week in August.

Amchitka Island

Amchitka is one of the poorest salmon production islands of its size for the chain (Table 1). The drainage's on the south half of the island are very short emanating from marshy tundra and a few small ponds. The largest salmon stream on the island is located in small mountains on the northwest end of the island (Appendices A.9, B.8). Streams #308-31-80 and 70 (common mouth) had only 620 pink salmon combined. The next largest pink escapement was 130 salmon at a stream near Blind Cape. Biologists for the Atomic Energy Commission also observed small numbers of pink, sockeye and coho salmon in other small creeks on the island (Valdez et al. 1977).

Forty percent of the pink salmon in the streams were "spawn-outs". Only the brightest fish were sampled. The fish averaged 2.6 pounds in weight, 449 mm in length, and the male to female ratio was 1.1:1 (Table 6). The peak of pink spawning on Amchitka occurred during the third to fourth week in August.

Semisopochnoi Island

Three drainages on Semisopochnoi appear to be able to support salmon; however, only Fenner Creek on the south side of the island had any fish (Appendices A.10, B.8). The other two streams

flowing from the cauldера had good aquatic habitat but no fish; perhaps due to dissolved chemicals or gas in the water. The escapement of 400 pink salmon in Fenner Creek, probably peaked near the end of August. Fenner Creek is a marginal salmon stream at best; it is steep, short, and is blocked by 30 foot falls one half mile from the sea. Salmon from this stream were nearly all spawned out, therefore, no weight data was taken.

Rat Island

No salmon streams were found on this island.

Kiska Island

The largest escapement of pink salmon at Kiska Island was 31,900 fish in Gertrude Cove. There are several smaller escapements of pink salmon on the island; four of these streams each averaged approximately 2,800 fish (Appendices A.11, B.9). The peak of the escapement probably occurred during the third and fourth weeks of August. The average weight of the fish sampled was 3.0 pounds. These late run salmon were fairly bright, compared to other streams, having no "fungus" (*Saprolegnia sp.*) growth on their bodies. Eight sockeye, twenty coho, and one chum salmon were also observed but were not sampled.

Shemya Island

Several streams and lakes on Shemya Island were examined in 1982 and 1983 (Appendices A.12, B.10). Only two small streams, the outlets to Laundry and Lower Lake were connected with salt water. No salmon were observed in these systems in 1982 or 1983; only stickleback and small dolly varden fingerlings were noted in Lower Lake and its outlet.

Murray (1984), ADF&G Sport Fishery Biologist, conducted limnology studies of Lower, Middle, and Laundry Lakes in June of 1984; dolly varden were captured in Lower and Middle Lakes. In July of 1994, coho salmon fingerlings from the Fort Richardson Hatchery were planted in Lower and Middle lake to support a recreational fishery for military personnel.

Murray and the author endorsed a U.S. Airforce request to the USFWS for improving the stream habitat of Lower Lake Creek for pink salmon. It is possible that this stream may have supported a small pink salmon run at one time. If there were salmon in either stream activities during W.W.II altered the streams so that they currently do not support salmon. The proposed project included clearing the stream of mud and debris, adding a spawning bed and resting pools. An incubator box stocked with eggs from nearby Attu Island was proposed to establish (or reestablish) a small run of pink salmon for base personnel's recreation. The proposal was never finalized.

Agattu Island

Adverse weather prevented study of Agattu Island, the only large island not surveyed (Appendices A.13,B.9). Most of the island's streams have steep falls near salt water and only a few streams were thought to support salmon. An estimated escapement of 2,775 pink salmon was based on the

author's aerial observations of spawning habitat during the spring of 1982 and observations made by USFWS personnel stationed on the island during the summer season. In 1982 USFWS were only aware of three salmon streams on the island. In 1989, USFWS juvenile salmon studies indicated an additional eight salmon streams on the island systems (Mary Farout, USFWS, personal communication, Kenai). Pink salmon are the dominant species on the island and there are a few streams supporting coho salmon.

The actual escapement for Agattu Island was probably much larger than estimated. Agattu Island has yet to have a comprehensive study of adult salmon distribution and abundance.

Attu Island

Approximately 40% of the salmon streams on Attu Island were investigated (Appendices A.13,B.11.). Rough topography prevented the field party from reaching the Nevidskov River, Etienne Lake and the northern portion of the island west of Holtz Bay. Weather prevented an aerial survey of inaccessible areas by the main research party based on the *RV ALASKA*. As a result, the field party devoted themselves to conducting an intensive investigation of the streams on the east end of the island.

Pink salmon were the dominant species, moderate escapements of 48,197 and 33,042 fish were observed in the Henderson and Peaceful Rivers (Table 7). The Cories/Canirco and Lake Nicholas systems had escapements of nearly 12,500 pink salmon each. The Temnac River had a lower than expected escapement of 6,585 pink salmon. The system appeared to have the potential of producing 50-70,000 fish. The low escapement may have resulted from either the run peaking after the last survey (September 1), or perhaps is a reflection of floods and scouring resulting from the steep watershed surrounding the stream.

The average weight of 37 "bright" pink salmon taken in the Peaceful River with a fishing pole in 1983 was 3.4 pounds, 442 mm in length and had a male to female ration of 1.5:1. This average weight might have been high as the sample contained 68% males. A sample of spawning pink salmon averaged 1.8 pounds in weight, 434 mm in length, and had a male to female ratio of 0.9:1 (Table 6).

Both the timing and magnitude of pink salmon escapements are highly variable, between streams and from year to year. Pink salmon run timing in Massacre Bay has been reported to vary by as much as a month. Pink salmon usually begin to enter the streams in late July and early August. Glenn Davenport reported in 1979 that the runs usually entered first at Casco Cove and progressively moved into the Peaceful and Henderson rivers (ADF&G, Cold Bay, personal communication). In 1978, pink salmon did not enter the Henderson River until September, nearly a month late (Vern Higgenson, Shemya, personal communication). In 1982, pink salmon were observed in the Peaceful River on July 1, where escapements peaked by August 19. The peak pink escapements occur in most of the systems between mid- August to the first week of September.

The peak sockeye salmon escapements in the surveyed streams were 563 fish (Table 7). Lake Nicholas had the largest escapement of 530 fish. The counts for this lake are very conservative,

since the investigators were restricted to foot surveys of the lake shore. Aerial or boat surveys would provide a better assessment of the escapement in this 200 acre lake.

Otoliths taken from carcasses at Lake Nicholas were predominantly (86%) age 3.3 fish (Table 5). Lake Nicholas fish (spawn outs) averaged 2.7 pounds (1.2kg) in weight, 505 mm in length, and had a male to female ratio of 1.7:1 (Table 6). Only 14 sockeye salmon were observed in Lake Canirco sections of the Lake Cories/Canirco drainage; 75% of a sample of 8 carcasses from these lakes were age 1.3 fish. These three systems were once important sources of subsistence salmon for the old village of Attu. Five sockeye carcasses were sampled from Lake Elwood were 60% age 1.3, averaged 4.4 pounds in weight, 551 mm in length and had a sex ratio of 4.0:1.

Only 15 adult coho were observed in three streams on Attu Island (Table 7). The Henderson River had the largest escapement of 12 adults. Coho fry, fingerlings and smolt were observed in seven additional streams (Table 8). Escapements of a few hundred coho salmon have been previously reported from Casco Cove, the Peaceful and Henderson Rivers. The small numbers of coho salmon present in 1982 negated biological sampling. Coho returns may be highly variable or identification errors may have occurred in the past reports of their abundance. Bright female pink salmon at Attu are often mistaken as "silvers" (Vern Higginson, Shemya, personal communication).

Coast Guard personnel at Attu reported that the few "silvers" caught average five to six pounds and the largest weighing ten pounds. The author speculates that some of these fish may have been bright pink salmon.

Only one chum salmon was observed in the Henderson River during the 1982 surveys. Glen Davenport observed "a few hundred small chums, about four pounds or so, in spawning condition" on August 29, 1967 (ADF&G, Cold Bay, personal communication).

In order to complete the assessment of the remainder of the island it will be necessary to survey a minimum of 16 additional stream and lake systems. The most expedient method would be an aerial survey. This survey could be conducted with a small fixed wing aircraft (Super Cub) or a small helicopter. The USCG offered to assist this project by transporting either aircraft to Attu via C-130. A lower cost alternative would be to utilize a field party equipped to traverse the rugged terrain of the island.

Selected streams on Attu were surveyed by the USFWS in 1988. They observed sockeye in Etienne Lake, "a good run of pinks" in the Peaceful River, and coho juveniles in the Temnac River. Unfortunately there were no counts of adult salmon (John Martin, USFWS, Homer, personal communication).

CONCLUSIONS

Pink salmon are the predominant species of salmon in the Aleutian Islands (Tables 1 and 2). Small stocks of sockeye, chum, and coho salmon occur sporadically throughout the chain, they would not be expected to support a commercial fishery. No streams were found which supported chinook

salmon. While small runs of coho exist on many of the islands they are probably not abundant enough to support a commercial fishery. Adverse fall weather conditions would make it nearly impossible to manage a coho fishery. Unalaska Island has three small to moderate stocks of sockeye that can occasionally supported a small harvest. Any Aleutian salmon fishery will target pink salmon with the incidental harvest of other species.

International North Pacific Fisheries Commission (INPFC) studies have shown that large numbers of both Alaskan and Asian sockeye, chum or chinook salmon stocks migrate through the Aleutian Islands (Hartt 1962, INPFC 1963). The creation of any new interception fisheries would be unacceptable under the current policies of the Alaska Board of Fisheries. Present commercial fishing regulations prevent interception harvests by restricting the commercial fishing season to July 10 to September 30, except in the Kashega Bay Section which opens June 1 (ADF&G, 1996). The Atka/Amlia fishery is restricted to 100 fathom set gillnets fished from the shore during August (ADF&G, 1996).

Aleutian pink salmon runs are cyclic. The magnitude and timing of these runs can fluctuate considerably from year to year and from stream to stream. Returns are usually stronger during even years, but may fail for no apparent reason during any given year.

The majority of the islands in the Aleutian Chain do not have enough salmon to support a commercial salmon harvest. An exception to this statement is Unalaska Island. Excellent pink salmon escapements were observed in 1982 and 1984, with fair to good escapements during most even years with the exception of 1996. Much of the island has been virtually unexploited. During peak years the Unalaska fishery might expand to include some of the productive streams on South Umnak Island. Unalaska salmon harvests in recent years have been negligible do to a continuing lack of markets for pink salmon.

If markets for pink salmon improve Atka, Adak, and possibly Attu could support moderate fisheries during certain years.

Local subsistence harvest of sockeye and coho salmon is very important to the communities of Unalaska, Nikolski and Atka, most years local runs may be completely utilized (Veltre and Veltre 1982, 1983; Jacob Chercasen, personal communication, Nikolski Village). Pink salmon escapements in Massacre Bay streams on Attu, and Finger Bay on Adak are the focus of sport fisheries for local military personnel. Quail Bay Lake on Kagalaska has been a popular source of personal use sockeye for Adak residents. Development of commercial fisheries in these areas should take these existing uses into account.

Compared with other salmon resources in the state, the number of fish available in the Aleutians is very small. The 1982 study was conducted during an optimal year for pink salmon and may represent maximum escapements of unexploited stocks.

Salmon fisheries in the Aleutians face considerable difficulties. Foremost is lack of interest in processing salmon. Currently the only active salmon facilities are in King Cove on the Alaska Peninsula. (Dutch Harbor and Atka have inactive facilities). All-weather anchorages are few and

far between. There are serious logistic difficulties caused by the distance separating areas of pink salmon abundance. Highly variable run strength and timing make it difficult to plan and manage a fishery. Funding no longer exists to staff a salmon management biologist in the Aleutians. Marketing difficulties are a major constraint considering the present trend of a statewide surplus of pink salmon.

LITERATURE CITED

- ADF&G (Alaska Department of Fish and Game) and CFEC(Commercial Fisheries Entry Commission). 1981. Expected impacts of the proposal to create a separate Aleutian Islands salmon permit area. A report to the Twelfth Alaska Legislature. Alaska Department of Fish and Game, and Commercial Fisheries Entry Commission, (Unpublished Report), Juneau.
- ADF&G (Alaska Department of Fish and Game) and CFEC(Commercial Fisheries Entry Commission). 1990. A review of the salmon fisheries west of Unalaska. A report to the Sixteenth Alaska Legislature. Alaska Department of Fish and Game, and Commercial Fisheries Entry Commission, (Unpublished Report), Juneau.
- ADF&G (Alaska Department of Fish and Game). 1968 (Revised 1974). Catalog of waters important for spawning and migration of anadromous fishes. Alaska Department of Fish and Game, Juneau.
- ADF&G (Alaska Department of Fish and Game). 1968 (Revised 1983). Catalog of waters important for spawning and migration of anadromous fishes. Alaska Department of Fish and Game, Juneau.
- ADF&G (Alaska Department of Fish and Game). 1968 (Revised 1995). Catalog of waters important for spawning and migration of anadromous fishes. Alaska Department of Fish and Game, Juneau.
- ADF&G (Alaska Department of Fish and Game). 1996. 1996-1997 Bristol Bay, Alaska Peninsula, Atka-Amlia, and Aleutian Is. Areas commercial fishing regulations. Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau.
- Atkinson, C.E., 1955. A brief review of the salmon fishery in the Aleutian Islands area. International North Pacific Fisheries Commission Bulletin 1:95-104, Vancouver, British Columbia, Canada.
- Barrett, B.M., F.M. Thompson, and S.W. Wick. 1984. Adult anadromous fish investigations: May-October 1984. Report to the Alaska Power Authority. Alaska Department of Fish and Game, Susitna Hydro Aquatic Studies, Report 6. Anchorage.
- Clutter, R., and L. Whitesel. 1956. Collection and interpretation of salmon scales. International Pacific Salmon Fisheries Commission, Bulletin 9, Vancouver, British Columbia, Canada.
- Cousens, N.B.F., G.A. Thomas, and C.G. Swann, 1982. A review of salmon estimation techniques. Canadian Journal of Fisheries and Aquatic Sciences, Technical Report 1108, Nanaimo, British Columbia, Canada.

LITERATURE CITED (Cont.)

- Gharrett, A.J., C.Smoot, A.J. McGregor and P.B. Holmes, 1985. Genetic relationships of even-year Northwestern Alaska pink salmon. Transactions of the American Fisheries Society. 117:536-545.
- Hanamura, N., 1967. Salmon of the North Pacific Ocean-Part IV. International North Pacific Fisheries Commission Bulletin 23, Vancouver, British Columbia.
- Hartt, A.C., 1962. Movement of salmon in the North Pacific Ocean and Bering Sea as determined by tagging, 1956-1958. International North Pacific Fisheries Commission Bulletin 6.
- Holmes, P. B., 1982. 1982 Aleutian Islands salmon stock assessment study. Special Report to the Alaska Board of Fisheries. Kodiak, Alaska.
- Holmes, P.B., 1995. Atka-Amlia Islands Management Area Pink Salmon Fishery 1992, 1993, 1994. Regional Information Report. No. 4K95-9. Alaska Department of Fish and Game. Kodiak.
- Holmes, P.B., and A.R. Shaul, 1996. Aleutian Islands and Atka-Amlia Islands Management Areas Annual Salmon Management Report, 1995. Regional Information Report. No. 4K96-45. Alaska Department of Fish and Game. Kodiak.
- INPFC (International North Pacific Fisheries Commission). 1963. Annual Report 1961, Vancouver, British Columbia.
- Johnson A., and B. Barrett. 1988. Estimation of salmon based on stream survey data: a geometric approach. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K88-35, Kodiak.
- Kim, W. S., and K. Robertson. 1968. On the use of otoliths of sockeye salmon for age determination. Pages 151-168. in R. Burgner, editor. Further studies of Alaska sockeye salmon.
- McGregor, A.J. 1982. A biochemical genetic analysis of pink salmon (*Oncorhynchus gorbuscha*) from selected streams in northern Southeast Alaska. Master's thesis. University of Alaska-Juneau, Juneau.
- McCullough, J. N. 1986. Abundance, age, sex and size of salmon (*Oncorhynchus* sp.) catch and escapements in Alaska Peninsula-Aleutian Islands in 1985. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 209, Kodiak.

LITERATURE CITED (Cont.)

- McCullough, J. N. 1989. Alaska Peninsula and Aleutian Islands Management Areas salmon catch and statistics, 1988. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K89-13, Kodiak.
- Minard, E.R. editor. 1986. Calibration of aerial surveys and determination of stream life for coho salmon (*O. kisutch*) spawning in the Gechiak River. Pages 103 to 121, in Proceedings of the Bristol Bay Coho Workshop. Alaska Department of Fish and Game, Division of Commercial Fisheries, Region III Data Report Series 86-1, Anchorage.
- Mosher, K.H. 1968. Photographic atlas of salmon scales. Bureau of the U.S. Fish and Wildlife Service, Fishery Bulletin 2: 243-274.
- Murray, John B. 1984. Angler use and stock assessment studies. Pages 1-37, in Federal Aid and Fish Restoration and Anadromous Fish Studies F-9-17. Volume 26. Alaska Department of Fish and Game, Division of Sport Fish. Juneau.
- Netsvetov, Iakov. 1844. The Journals of Iakov Netsvetov: The Atkha Years, 1828-1844. Translated, by Lydia Black, 1980. Materials for the Study of Alaska History, No. 16, Limestone Press. Kingston, Ontario.
- Palmer, Douglas E. 1995. Survey of fisheries resources on Adak Island, Alaska Maritime National Refuge, 1993 and 1994. Alaska Fisheries Technical Report No. 29. U.S. Fish and Wildlife Service. Kenai.
- Shaul, A.R., T. R. Gilmer, J.N. McCullough. 1983. 1983 Finfisheries Annual Report, Alaska Peninsula-Aleutian Islands areas. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional IV (Unpublished Report), Kodiak.
- Shaul, A.R., J.N. McCullough, A.J. Quimby, R.S. Berceli, M.E. Stopha. 1991. Alaska Peninsula and Aleutian Islands areas annual salmon and Herring Management Report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K91-12, Kodiak..
- Seimenstad, C.A., J.S. Isakson, and R.E. Nakatani 1977. Marine fish communities. in M.L. Merritt and R.G. Fuller eds. The environment of Amchitka Island, Alaska. United States Energy Research and Development Administration, Technical Information Document 26712, Oak Ridge.
- Valdez, R.T., W.T. Helm, and J.M. Neuhold, 1977. Aquatic ecology in M.L. Merritt and R.G. Fuller eds. The environment of Amchitka Island, Alaska. United States Energy Research and Development Administration, Technical Information Document 26712, Oak Ridge.

LITERATURE CITED (Cont.)

- Veltre, D.W., and M.J. Veltre. 1982. Resource utilization in Unalaska, Aleutian Islands, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper Series 58, Juneau.
- Veltre, D.W., and M.J. Veltre. 1983. Resource utilization in Atka, Aleutian Islands, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper Series 88, Juneau.
- Veniaminov, Ivan. 1840. Notes on the Islands of the Unalaska District. Translated by Lydia Black and R.H. Geoghegan, 1984. Materials for the Study of Alaska History, No. 27, Limestone Press. Kingston, Ontario.
- Willimovsky, N.J., 1963. Inshore fish fauna of the Aleutian Archipelago. Pages 172 to 189, in G. Dahlgren, editor. Proceedings of the Fourteenth Alaska Science Conference. Anchorage.

Table 1. Peak and estimated total escapements for Aleutian Islands salmon, 1982.^a

Island	Species ^b							
	Pink		Sockeye		Chum		Coho	
	Peak Cnt.	Est. Total	Peak Cnt.	Est. Total	Peak Cnt.	Est. Total	Peak Cnt.	Est. Total
Akutao ^c	10,500	19,425	0	0	0	0	0	0
Unalaska	1,541,317	2,851,436	44,995	89,990	100	175	300	525
Umnak ^d	295,385	546,462	805	1,610	0	0	143	250
Anlia	138,258	255,777	453	906	772	1,351	0	0
Atka	578,086	1,069,459	3,971	7,942	1,482	2,594	825	1,444
Igiktan	0	0	0	0	0	0	0	0
Great Sitkin	7,720	14,282	0	0	0	0	0	0
Unak	230	426	0	0	0	0	0	0
Little Tanaga	1,550	2,868	0	0	0	0	0	0
Kagalaska	3,310	6,124	975	1,950	0	0	0	0
Adak	362,438	670,510	993	1,986	0	0	0	0
Kanaga	18,448	34,129	0	0	0	0	0	0
Tanaga	68,585	126,882	0	0	0	0	0	0
Semisopochnoi	400	740	0	0	0	0	0	0
Amchitka	1,248	2,309	0	0	0	0	0	0
Rat Island	0	0	0	0	0	0	0	0
Kiska	43,393	80,277	8	16	1	2	20	35
Agattu ^e	1,500	2,775						0
Shemya	0	0	0	0	0	0	0	0
Attu ^f	133,589	247,140	220	440	1	2	14	25
Total	3,205,957	5,931,020	52,420	104,840	2,356	4,123	1,302	2,279

^a Streams surveyed between 8/12 and 9/17.^b Peak salmon counts expanded (to estimate total escapement) by: 1.85 for pink salmon, based on the average ratio of peak surveys to total estimated escapement for 1985, 1988, and 1990 (McCullough 1986, 1989, and Shaul et al. 1991); 1.75 for chum salmon (Shaul, et al., 1991); by 2.0 for sockeye salmon (Barrett, et al., 1984); 2.4 for coho salmon based on data from Minard (1986). Expanded estimates are not absolute numbers, they provide the best approximation of total escapement based on limited survey data. Coho escapements were underestimated due to survey timing.^c Harbor Creek only stream surveyed.^d Includes sockeye in Village Lake (670) estimated from number of spawning redds.^e Island not surveyed, estimate based on stream morphology and USFWS salmon observations on east side of the island.^f Only 40% of the potential salmon streams surveyed in 1982.

Table 2. Peak salmon escapements counts for selected streams near the Adak Naval Station, 1977 to 1994.^a

Species	Year	Finger Bay	NavFac Creek	Big Thumb Bay	Little Thumb Bay	Scabbard Bay
Pink						
	1977	2,300				
	1978	14,000				
	1979					
	1980	7,059	894		1	Few Remains
	1981	38,000 ^b	400			
	1982	100,000	1,400	7,000	45,000	6,250
	1987	750 ^c				
	1988	41,682				
	1993 ^d	14,500	380		2,050	875
	1994 ^d	45,400	5,560		33,400	6,122
Coho						
	1977	2				
	1979				^a	
	1980			4		1
	1981	1		^a		
	1993 ^d	30	10		77	
	1994 ^d	49	119		15	
Sockeye						
	1977	20				
	1980	2				
	1993 ^d	2				
	1994 ^d	8				

^a Leslie Slater, Van Klett, USFWS, Adak, personal communication.

^b Possibly over estimated.

^c Partial survey below spawning pool, Mary Faurot, USFWS, Kenai, personal communication.

^d Counts were conducted late in the run, so that few or no salmon were seen. However, general observations by USFWS employees and fishermen confirmed the presence of fish earlier in the season.

^e Palmer, 1995.

Table 3. Aleutian Islands Area (excluding Atka and Adia Islands) commercial salmon catches (in numbers of fish), 1911-1996.

Year	Permits	Landings	Chinook	Sockeye	Coho	Pink	Chum	Total
1911			0	9,300	0	0	0	9,300
1912-15			0	0	0	0	0	0
1916			0	76,500	1,200	180,300	100	258,100
1917			0	70,400	3,800	600	23,100	97,900
1918			0	55,200	4,400	75,600	135,200	270,400
1919			0	3,900	800	4,000	0	8,700
1920			0	10,100	2,800	0	0	12,900
1921			0	0	0	0	0	0
1922			0	14,000	0	0	0	14,000
1923			0	0	0	0	0	0
1924			0	24,900	0	673,800	100	698,800
1925			0	18,600	0	3,800	9,100	31,500
1926			0	1,300	0	521,700	7,800	530,800
1927			0	17,300	0	334,600	0	351,900
1928-50								
1951			0	11,700	400	500	94,500	107,100
1952			200	42,800	0	31,800	25,700	100,500
1953			0	4,200	500	69,200	800	74,700
1954			0	6,300	800	566,500	200	573,800
1955			0	12,600	100	31,100	400	44,200
1956			0	400	0	33,900	0	34,300
1957			2,300	27,300	100	500	13,900	44,100
1958			0	300	0	613,200	3,700	617,200
1959			0	6,100	0	12,000	100	18,200
1960			0	7,600	0	444,900	300	452,800
1961			0	2,700	0	94,000	200	96,900
1962			0	5,500	100	2,001,700	1,200	2,008,500
1963			0	4,500	0	93,900	300	98,700
1964			0	200	0	194,100	2,300	196,600
1965			0	0	0	0	0	0
1966			0	1,000	0	63,500	700	65,200
1967			0	200	0	7,900	0	8,100
1968			0	2,000	100	902,800	800	905,700
1969			0	1,900	0	242,200	1,500	245,600
1970	45	361	6	208	135	644,121	3,029	647,499
1971	11	105	0	333	2	45,141	58	45,507
1972	8	28	0	69	1	2,784	6	2,860
1973	3	6	0	0	0	2,042	0	2,042

-Continued-

Table 3. (page 2 of 2)

Year	Permits	Landings	Chinook	Sockeye	Coho	Pink	Chum	Total
1974	0	0	0	0	0	0	0	0
1975	5	6	0	19,402	0	659	1,881	21,942
1976-77	0	0	0	0	0	0	0	0
1978	6	32	0	1,829	0	38,109	6	39,944
1979	10	124	0	12,206	0	539,393	242	551,841
1980	28	263	2	9,226	2	2,597,461	4,874	2,611,565
1981	16	85	16	5,430	188	302,786	6,553	314,973
1982	15	164	0	2,672	28	1,447,818	6,148	1,456,666
1983	2	11	0	4,405	0	2,005	11,361	17,771
1984	37	281	26	67,163	1,923	2,309,665	32,025	2,410,802
1985	3	4	40	2,750	0	90	14,175	17,055
1986	9	31	11	7,702	60	42,621	38,819	89,213
1987	1	1	0	75	0	0	0	75
1988	3	31	0	4,315	7	183,109	450	187,881
1989	2	6	0	8,248	0	6,700	0	14,948
1990	15	49	2	12,435	74	282,823	1,038	296,372
1991	1	2	0	796	0	0	0	796
1992	4	20	0	3,082	0	312,072	1,230	316,384
1993	0	0	0	0	0	0	0	0
1994	10	64	47	6	0	858,787	617	859,457
1995	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0
<u>Average:</u>								
Odd Year:								
1977-1995	4	23	6	3,391	19	85,097	3,233	91,746
<u>Even Year:</u>								
1977-1995	13	94	9	10,843	209	807,247	8,521	826,829

Table 4. Atka-Amlia Area commercial salmon catches (in numbers of fish), 1992-1996

Year	Permits	Landings	Chinook	Sockeye	Coho	Pink	Chum	Total
1992 ^a	13	41	0	231	42	7,972	308	8,553
1993 ^b	9	10	0	24	4	145	563	736
1994 ^c	6	7	0	16	0	896	0	912
1995 ^b	8	0	0	0	0	0	0	0
1996 ^c	11	1	0	0	0	20	0	0
Average:	9	15	0	68	12	2,253	218	2,550

^a Fisherman were never paid for their catch by processor.

^b No local market for salmon, catch retained for personal halibut bait and subsistence.

^c Small salmon return, no market, fishermen fished for halibut.

Table 5. Age composition of sampled Aleutian Islands sockeye and chum salmon escapements, 1982.

Location	Date	Sockeye Age									
		1.2	1.3	2.2	3.1	3.2	2.3	4.2	3.3	4.3	
Unalaska Island:	8/16	0	40	1	0	0	5	0	0	0	Number ^a
Kashaga Lakes		0	87	2	0	0	11	0	0	0	Percent
Atka Island:	8/25	5	2	2	0	0	1	0	0	0	Number ^a
Triple Lakes		50	20	20	0	0	10	0	0	0	Percent
Kagalaska Is.:	8/29	0	0	13	0	3	6	0	1	0	Number ^b
Quail Bay Lake		0	0	57	0	13	26	0	4	0	Percent
Adak Island:	9/2	2	5	26	0	0	15	0	0	0	Number ^a
Hidden Bay Lake		4	10	54	0	0	31	0	0	0	Percent
Attu Island:		0	0	0	0	5	19	1	119	1	Number ^c
Lake Nicholas	8/4-9/22	0	0	0	0	3	13	0	83	1	Percent
Casco Cove Lake	8/24	0	0	0	0	0	1	0	0	0	Number ^c
		0	0	0	0	0	100	0	0	0	Percent
Lake Elwood	8/18-8/22	0	3	0	0	0	2	0	0	0	Number ^c
Percent		0	60	0	0	0	40	0	0	0	
Lake Canirco	8/15-8/23	1	6	0	0	0	0	0	0	0	Number ^c
		14	86	0	0	0	0	0	0	0	Percent
Lake Cories	8/16	0	0	0	0	0	1	0	0	0	Number ^c
		0	0	0	0	0	100	0	0	0	Percent
Total		8	21	42	0	8	50	1	119	1	Number
		3	9	17	0	3	20	0	48	0	Percent

Location	Date	Chum Age				
		0.2	0.3	0.4	0.5	
Atka Island	8/23	6	15	2	0	Number ^a
"Old Harbor" (Koroviniski Lagoon)		26	65	9	0	Percent

^a Sample ages from otoliths from spawning fish.^b Sample ages from otoliths and scale samples.^c Sample ages from otoliths taken from carcasses.

Table 6. Average length, weight, and sex ratios for sampled Aleutian Islands salmon, 1982.

						Species											
Pink						Sockeye						Chum					
Location	Date	Number	Length (mm)	Weight (lb)	Sex Ratio M:F	Location	Date	Number	Length (mm)	Weight (lb)	Sex Ratio M:F	Location	Date	Number	Length mm	Weight lb	Sex Ratio M:F
Unalaska Is. Nateekin R.	8/14	50	465	3.3	1.1:1	Kashega L.	8/14.	50	524	5.5	1.2:1						
Umnak Is. Sheep Cr.	8/18	50	458	3.8	7.3:1												
Atka Is. 305-32-290 ^a	8/23	43	481	4.2	2.6:1	Tripple Lks. ^a	8/25	10	481	3.4	0.7:1	305-32-290 ^a	8/23	50	601	7.6	1.5:1
305-42-50 ^b	8/25	50	456	1.4	0.7:1												
Mean			452	2.6 ^b	1.2:1												
Amliia Island 305-52-110 ^a	8/24	50	449	3.1	1.4:1												
Kagalaska Island Quail Bay Cr	8/29	50	447	2.9	0.9:1	Quail Bay Cr	8/29	25	508	3.4	0.8:1						
Adak Island Finger Bay Cr	9/1	51	491	3.4	1.4:1	Hidden Bay ^a	9/2	50	523	5.3	2.3:1						
Kanaga Island Kanaga Bay Cr	9/5	25	481	2.3	1.8:1												
Tanaga Island 307-23-070 ^a	9/5	25	461	3.3	2.6:1												
307-16-280 ^e	9/6	50	492	3.8	0.9:1												
Mean			476	3.6	1.7:1												
Amchitka Island 308-31-70&80 ^a	9/11	25	449	2.6	1.1:1												
Semisopichinoi Island Fenner Cr. ^b	9/12	50	465		0.7:1												

-Continued-

Table 6. (page 2 of 2)

Species																	
Pink						Sockeye						Chum					
Location	Date	Number	Length (mm)	Weight (lb)	Sex Ratio M:F	Location	Date	Number	Length (mm)	Weight (lb)	Sex Ratio M:F	Location	Date	Number	Length mm	Weight lb	Sex Ratio M:F
Kiska Island																	
Gertrude Cove ^a	9/6	50	461	2.9	1.1:1												
Attu Island																	
Peaceful R. ^b	8/17-24	115	434	1.8	0.9:1	Lk.Nicholas ^{bd}		151	505	2.7	1.7:1						
	7/29-8/3	37	442	3.4	1.5:1	Lk.Elwood ^{bd}		5	551	4.4	4:1						
						Corfies/Canirco		8	547	1.7	1.7:1						
						Casco Cove ^{bd}		1	480	4.4	0:1						
						Mean			507		1.8:1						
Total ^a		721	475	3.4	1.8:1			300	512	4.7:1	1.5:1			50	601	7.6	1.5:1

^aSalmon spawning, sample take from brightest fish.

^bFish spawned out, not used for comparative weights.

^cBright fish, just entering from salt water.

^dSample taken from carcasses of spawned out fish not used for comparative weights, Attu sockeye samples collected from carcasses during month of August.

^eMean weighted by sample size.

Table 7. Peak salmon escapement counts for selected streams on Attu Island, 1982.^a

Stream	Pinks	Sockeye	Chum	Coho
Addison Creek 309-13-40	1,424			
O'Donnel Creek Lake Corries/Canirco 309-14-10	3,690 12,416	14		
Lake Nicholas 309-14-40	12,500	530		2
Alexai Pt. Creek 309-15	847			
E. Massacre Creek 309-15-	280			
Henderson 309-15-30	48,197	9	1	12
Navy Town Creek 309-15-	840			
Peaceful River 309-15-40	33,042			1
Kingfisher Creek 309-15-	4,600			
South Casco Cove Lakes 309-15-	485	10		
Rocky Point Creek 309-25-	1,464			
George Creek 309-25-50	200			
Temnac River 309-25-40	6,585			
Leftler Creek 309-25-30	1,313			
Kaufman Creek 309-25-20	287			
Abraham River 309-25-30	1,565			
Total	133,589	220	1	14

^aRough topography restricted foot surveys to approximately 40% of the island's streams.

Table 8. Species of salmonids and life stages observed in Attu Island streams and lakes, 1982.

System Name	Salmon Species ^a				
	Pink	Sockeye	Chum	Coho	Dolly Varden
Addison Creek	A			F,R	S
O'Donnel Creek	A			R	A,R
McKenzie Creek	A				S
Lake Corries	A			F,S	S
Lake Canirco	A	A			R
Lake Nicholas	A	A,F		A,R	A,R
Alexai Creek	A				A
E. Massacre Creek	A				R
Henderson River (including Lake Elwood)	A	R	A	A,R	A,R
Navy Town Creek	A			R	A,R
Peaceful River	A			A	A,R
Kingfisher Creek	A				
S. Casco Cove Lakes	A	A		R	R
Rocky Point Creek	A				A
George Creek	A				A,R
Temnac River	A			R	R
Leftler Creek	A				
Kaufman Creek	A			R	A,R
Abraham River	A				R
Little Abraham	A				R

^a A = Adult, S = Smolt, R = Rearing, F = Fry.

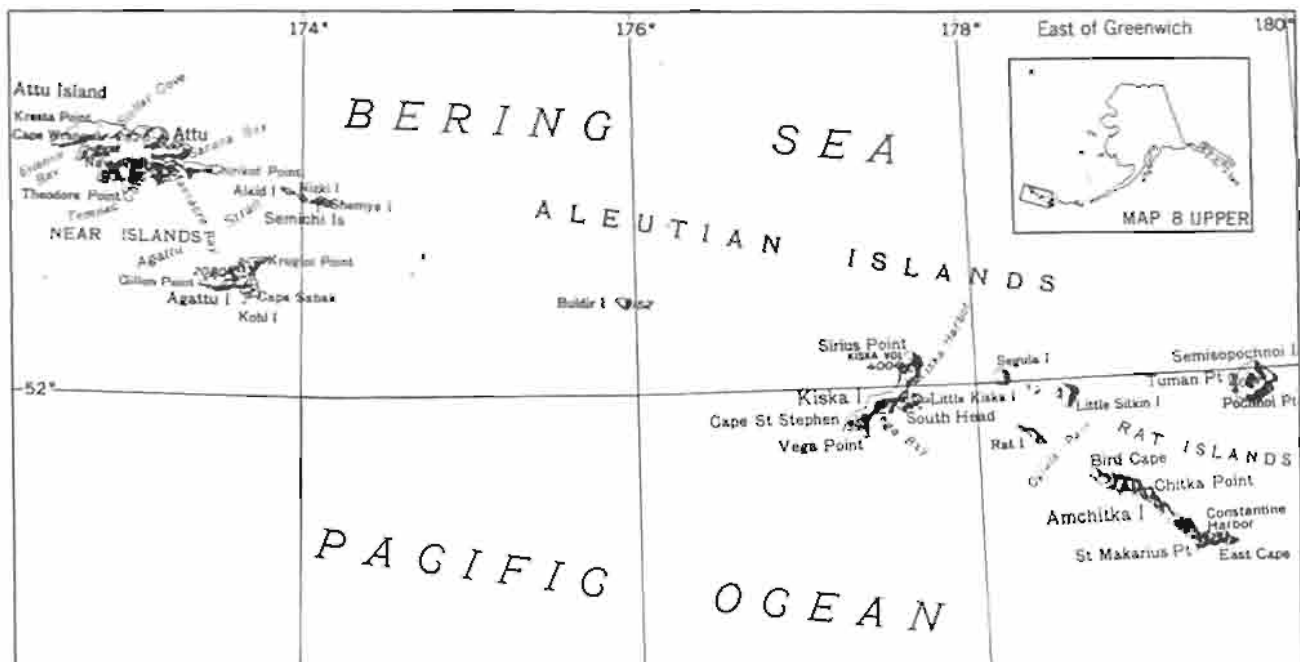


Figure 1.a. Aleutian salmon study area, western Aleutian Islands.

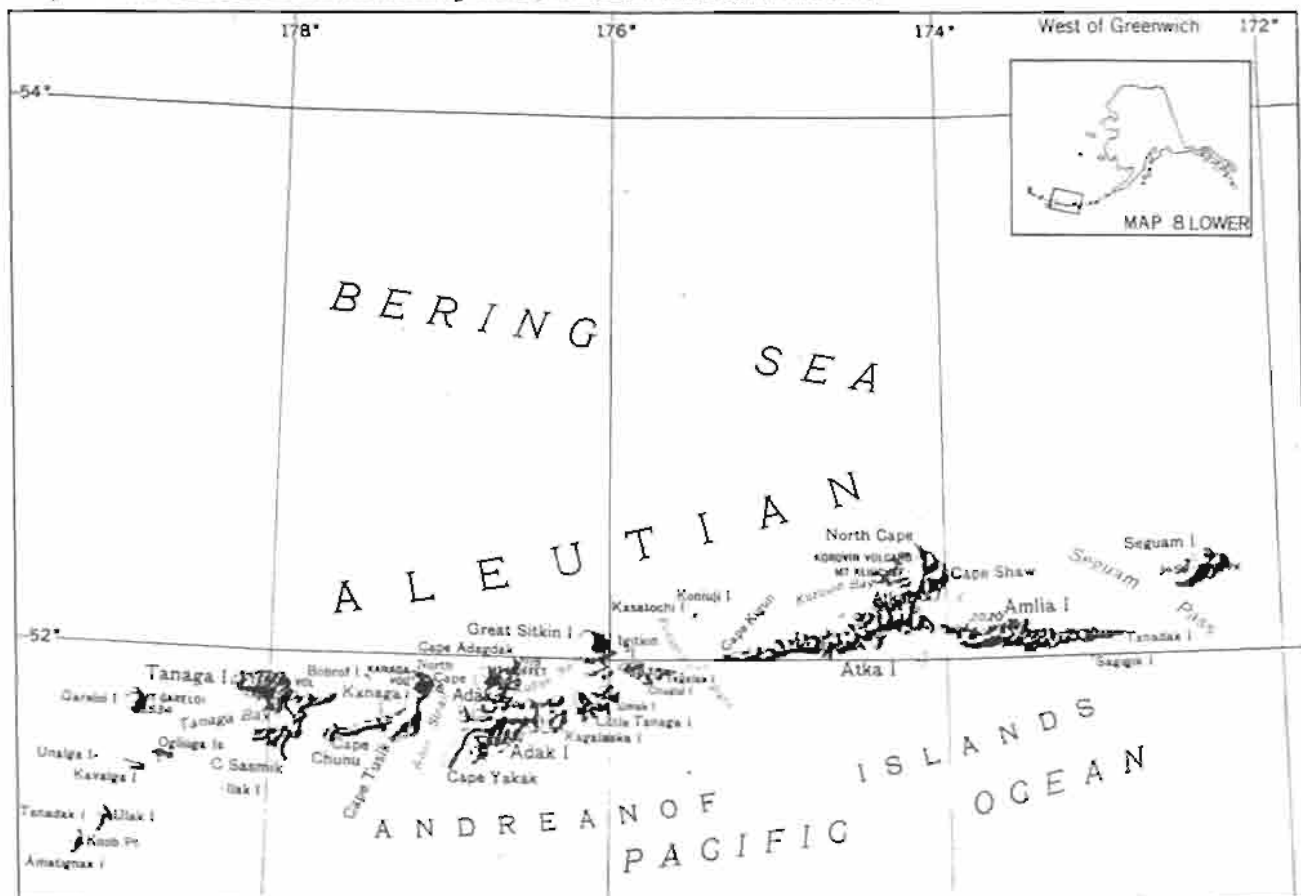
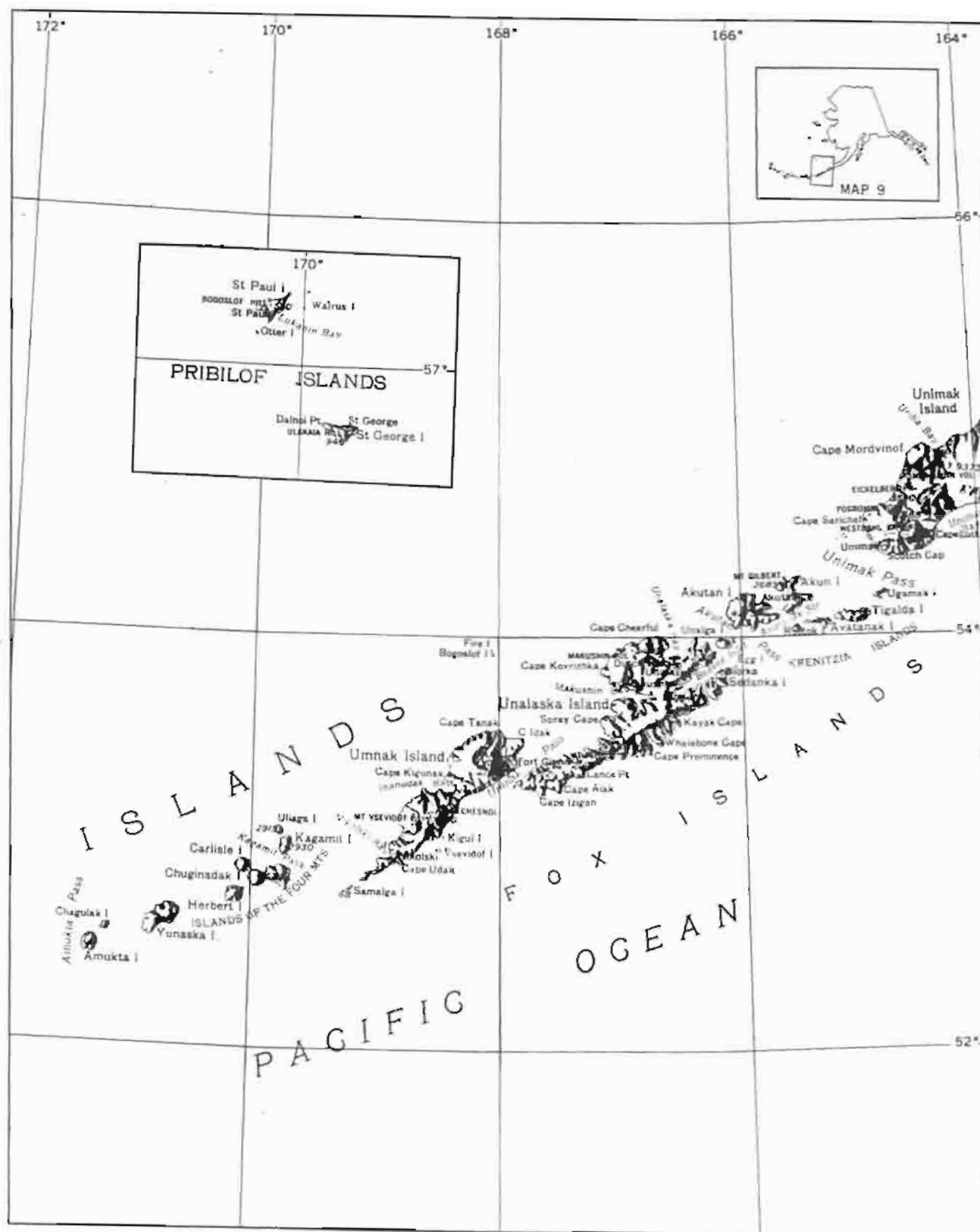


Figure 1.b. Aleutian salmon study area, central Aleutian Islands.



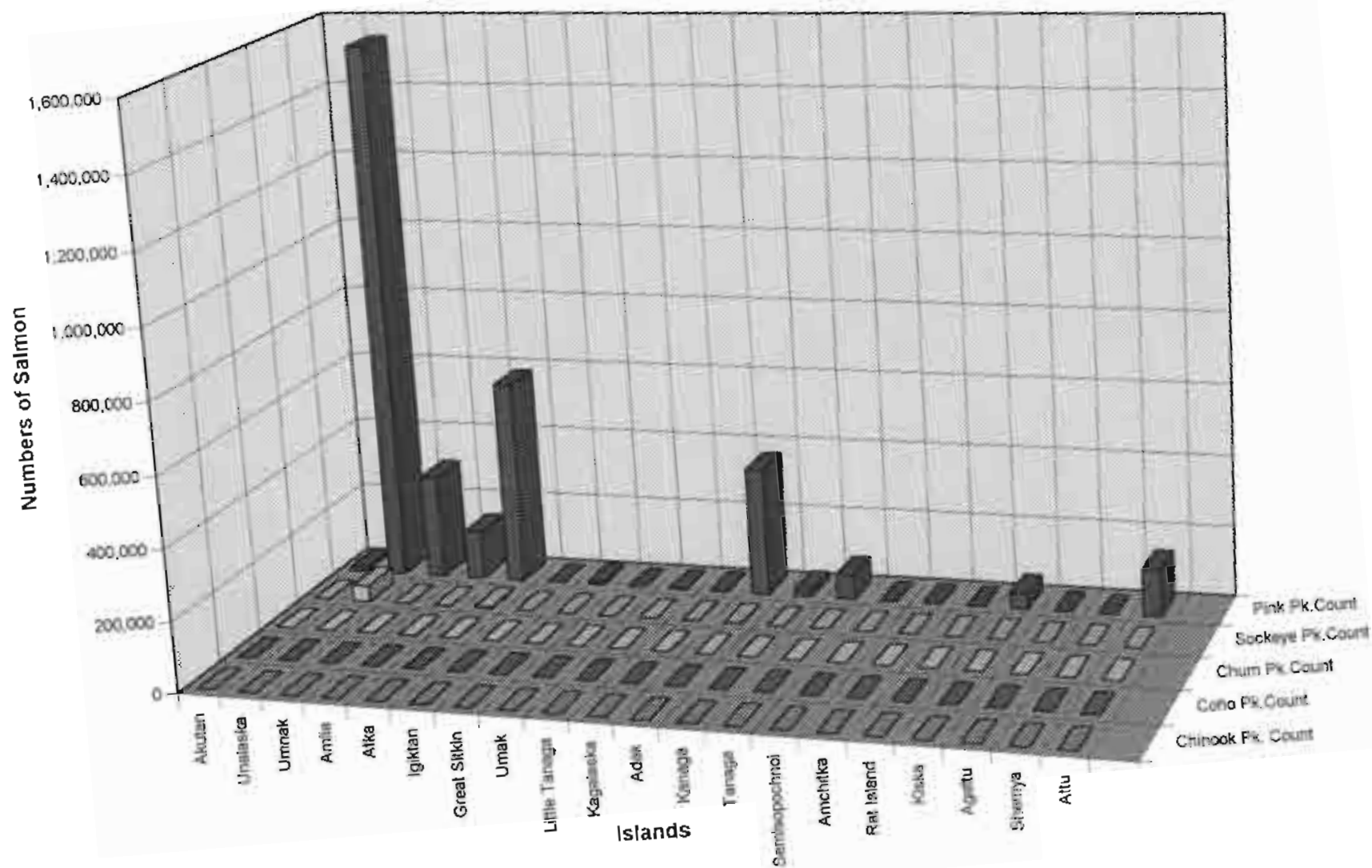


Figure 2. Peak salmon escapement surveys for Aleutian Islands, 1982.

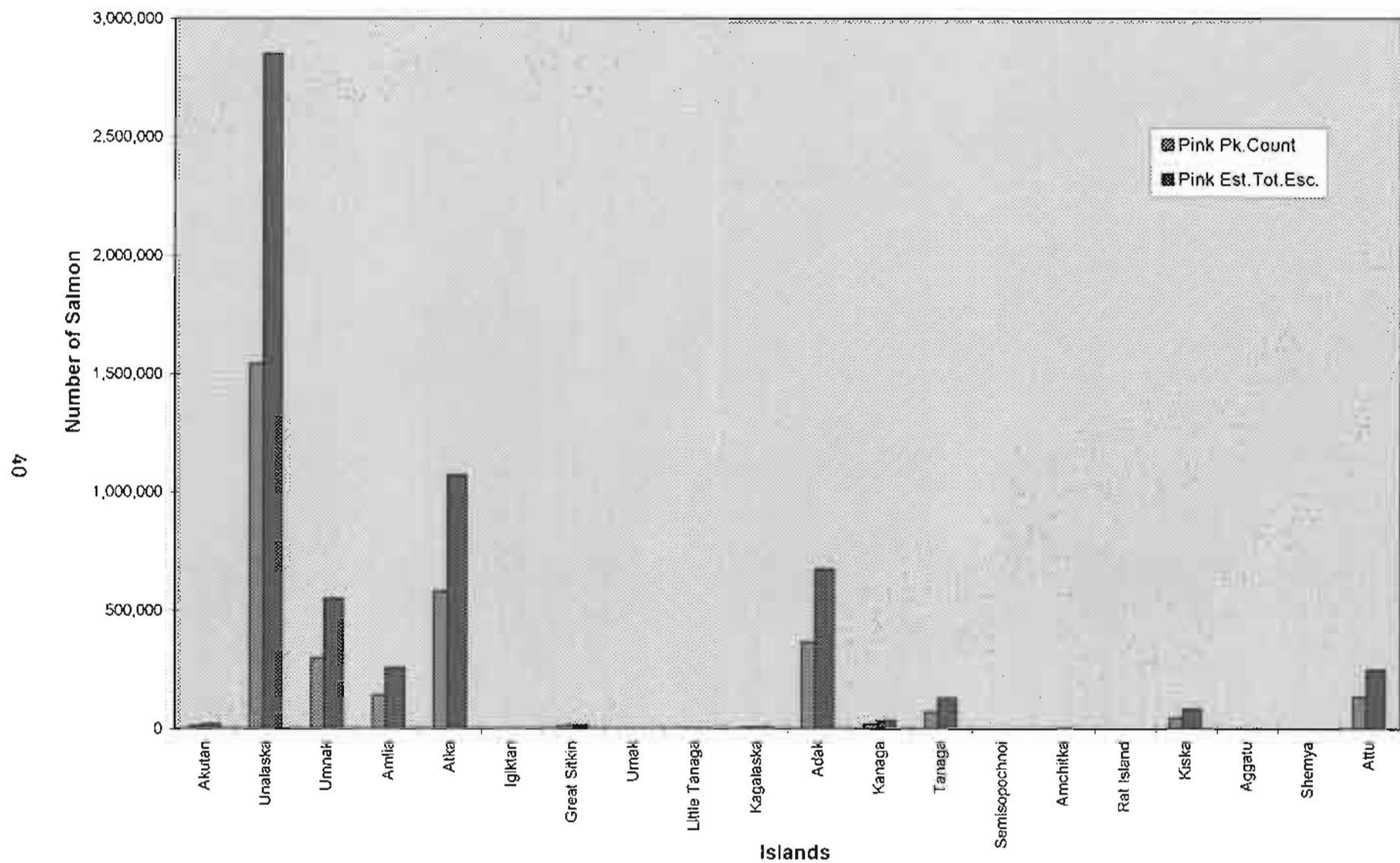


Figure 3. Pink salmon peak and estimated total escapement, 1982.

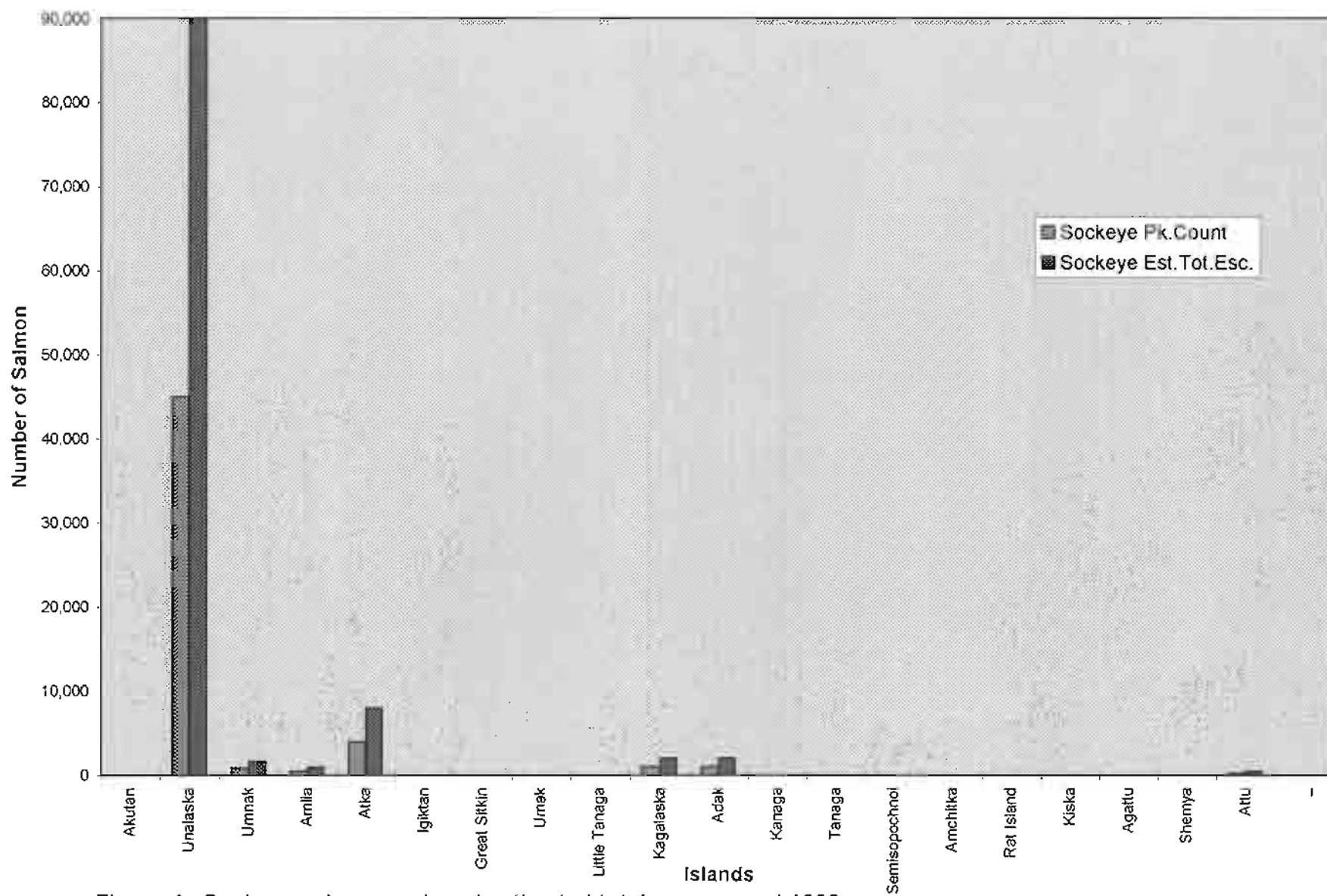


Figure 4. Sockeye salmon peak and estimated total escapement, 1982.

APPENDIX

Appendix A.1. Akutan and Unalaska Islands salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ¹
Akutan	Akutan Harbor Creek	10,500 pinks (1,500 of which are carcasses)	8/19	Foot Survey
Unalaska	302-31-40 (302-40-009) South Summer Bay	38,000 pinks	8/12	"
	302-31-30 (302-40-10) Central Summer Bay	38,000 pinks	8/12	"
	302-31-20 (302-40-11) North Summer Bay	500 pinks	8/07	Foot Survey
	302-31-10 Constantine Bay	0 salmon	8/15	Delete from anadromous catalog, closed system
	302-30-40 (302-30-01) Kalekta Bay	6,800 sockeye 100 pinks 100 chums (?)	8/15	
	302-30-130 (302-30-02) East Kalekta	350 pinks	8/15	
	302-30- Entrance of NW English Bay	2,400 pinks (2,100 off mouth)	8/15	Add to anadromous catalog
	302-30-120 (302-30-160) English Bay	13,700 pinks (6,000 off mouth) (700 carcasses)	8/15	
	302-50- Deep Bay	100 pinks	8/15	Add to anadromous catalog
	302-50- NE Agamgik Bay	2,000 pinks (1,900 off mouth)	8/15	Add to anadromous catalog. Fish could go into either NE or NW stream.
	302-50- NW Agamgik Bay	2,520 pinks (2,500 off mouth)	8/15	Add to anadromous catalog. Fish could enter either stream.
	302-50- Bight NE of Ugadaga Bay	1,250 sockeye 1,000 pinks	8/15	Add to anadromous catalog.
	302-50- Ugadaga Bay	6,600 pinks (3,100 off mouth)	8/15	Add to anadromous catalog
	302-31-50 Unalaska Lake	16,000 pinks	8/12	Peak count ²

-Continued-

Appendix A.1. (page 2 of 7)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
	302-31-80 (302-40-05) Nateekin River	150,000+ pinks 243,000 pinks	8/15 8/12	Foot survey 4 miles 9/10 of river. 2'
	302-31-90 (302-40-03) Makushin Valley River	43,400 pinks	9/03	Peak count ^{2'}
	302-31-70 (302-40-05) Shaishnikof River	18,000 pinks	8/12	2'
	302-50-60 Uniktali Bay	15,500 pinks	8/15	Possible rehabilitation (fish pass, stream channel).
	302-50- South Uniktali Bay	15,000 pinks	8/15	Add to anadromous catalog.
	302-50- Small Bay	2,300 pinks (2,000 at mouth)	8/15	Add to anadromous catalog.
	302-50- E. Arm Tanaskan Bay	2,500 pinks	8/15	Add to anadromous catalog.
	302-50-100 Head of Tanaskan Bay 302-50-100 Final Bay	21,000 pinks (6,000 off mouth) 47,000 pinks	8/15	
	302-50- Kisselen Bay	6,500 pinks	8/15	Add to anadromous catalog.
	302-50- Erskine Bay	8,500 pinks	8/15	Potential for chums. Add to anadromous catalog.
	302-50- West Udagak Bay	3,000 pinks (1,500 at mouth)	8/16	Add to anadromous catalog.
	302-50- East Udagak Bay	1,000 pinks	8/16	Add to anadromous catalog.
	302-50-140 Strait Bay	5,100 pinks (300 at mouth)	8/16	
	302-50-150 Udamat Bay	3,000 pinks (1,500 at mouth)	8/16	
	302-50- E. Udamat Bay	1,200 sockeye (?)	8/16	Add to anadromous catalog.
	302-70-90 Johnson Cove	8,500 pinks	8/16	Majority in lower 1/8 mile of stream, falls at 1 mile, 1 mile good gravel above.

-Continued-

Appendix A.1. (page 3 of 7)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
	302-70- 1.5 mile South Johnson Cove	100 pinks	8/16	Small lagoon could handle 1,000-2,000 fish. Add to anadromous catalog.
	302-80- Crow Arm of Raven Bay	25 pinks dolly varden	8/16	Marginal stream. Add to anadromous catalog.
	302-80- Head of Raven Bay	150 pinks	8/16	Marginal stream. Add to anadromous catalog.
	302-80- NW side of Upper Raven Bay	5 pinks dolly varden	8/16	Marginal stream. Add to anadromous catalog.
	302-80- W. Arm Eagle Bay	420 pinks	8/16	Add to anadromous catalog.
	302-80-10 Stream N Kuliliak Bay	7,000 pinks 550 sockeye	8/16	Five foot falls Possible fish pass location
	302-80- NW Kuliliak Bay	150 pinks	8/16	Marginal stream. Add to anadromous catalog.
	302-80- 1.25 miles West Williwa Pt.	600 sockeye 550 pinks	8/16	Add to anadromous catalog.
	302-22-30 (302-12-070) E. Kashega Lake & Stream	8,000 sockeye 48,600 pinks	8/16	Coho reported in this system.
	302-22-30 (302-12-07A) W. Kashega Lake	16,100 sockeye 47,300 pinks	8/16	
	302-60-10	No salmon	8/16	300 acre lake cut off by falls at beach. Rehabilitation (fish pass?).
	302-60-20	No salmon	8/16	Delete from anadromous catalog.
	2 miles south of 302-60-20	No salmon	8/16	Log jam at beach. Potential for small red system. Permanent rehabilitation be difficult due to semi-exposed beach.
	302-60-40	315 pinks	8/16	Stream periodically closed by beach action.
	302-60-70 Hive Bay	No salmon	8/16	Exposed beach- Stream blocked rehabilitation potential questionable
	302-60-80	1,300 sockeye	8/16	Dolly varden present.
	302-60-90 Knife Bay	No salmon	8/16	Exposed beach blocked stream.

-Continued-

Appendix A.1. (page 4 of 7)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
	302-60-110 Staraya Bay	7,300 sockeye 6,800 pinks (50 pink carcasses)	8/16	
	302-70-10 Protection Bay	1,050 sockeye 3,200 pinks	8/16	
	302-70- Three Island Bay	1,200 pinks	8/16	Marginal stream. Add to anadromous catalog.
	302-70- 2 mi. NW of USGS marker "Ear" on E. side of Blue- berry Bay.	2,050 pinks	8/16	Marginal Stream. Add to anadromous catalog.
	302-70- NE Arm of Usof Bay 1/2 mile E. of USGS marker "Bean"	300 pinks	8/16	Marginal stream. Add to anadromous catalog.
	302-70- NW Arm of Usof Bay 1/2 mile E. of USGS marker "Bean"	700 pinks	8/16	Marginal stream. Add to anadromous catalog.
	302-70- West side of Usof Bay	2,000 pinks	8/16	Under utilized stream could handle 5,000-10,000 fish. Add to anadromous catalog.
	302-22-10 Aspld Bay	23,500 pinks	8/17	
	302-22- Alimuda Bay	27,500 pinks	8/17	Near peak of run, add to anadromous catalog.
	302-22-20 W. Arm Kismaliuk Bay	46,000 pinks	8/17	
	302-22-40 E. Kismaliuk Bay	108,000 pinks	8/17	Streams 40&30 branch off same stream. rehabilitation of W. Arm #30 small fish pass.
	302-80-50	No salmon	8/17	Blocked, steep stream.
	302-80- Riding Cove	5,900 pinks	8/17	Falls at 1/3 mile blocked, 2/3 mile of excellent stream. Rehabilitation potential. Add to anadromous catalog.
	302-90- Huddle Rocks 1.75 miles West Lance Pt.	2,000 pinks	8/17	Few fish for quality of stream, periodically blocked by beach? Add to anadromous catalog.
	302-90- 6 miles NE of Cape Aiak.	1,000 pinks (+20 carcasses)	8/17	Add to anadromous catalog.

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Appendix A.1. (page 5 of 7)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ¹¹
	302-90-10 E. Surveyor Bay	No salmon	8/17	Delete from anadromous catalog.
	302-90-20 W. Surveyor Bay	52,400 pinks	8/17	Great stream.
	302-90-30	32,800 pinks	8/17	Great stream.
	302-90-40	8,800 pinks	8/17	
	302-21-10	No salmon	8/17	Blocked by beach.
	302-21-20 Boulder Bay	No salmon	8/17	Blocked by beach.
	302-21-30 No Name Cove	No salmon	8/17	Blocked with driftwood, not worth cleaning.
	302-21-60 Chernofski Ranch	2,000 pinks Few coho	8/18	Small stream near Milt Holm's ranch
	302-21- S. Chernofski Bay	62,000 pinks	8/18	Foot survey, substantial over escapement.
	302-21-50 E. Station Bay	79,000 pinks (3,000 at mouth)	8/18	Surveyed 7/8 of stream. Actual escapement probably larger
	302-21-40 W. Station Bay	40,000 pinks	8/18	Poor visibility, may have missed fish.
	302-22-60 McIver Blight	120 sockeye 150 coho 3,700 pinks plus (48,000 pink carcasses)	9/19	Recent high water, unknown number of carcasses washed out in systems surveyed on 9/19.
	302-22-90 Pumicestone Bay	No fish	9/19	Marginal salmon habitat.
	302-22- 1.75 miles E. of 302-22-90	45 pinks	9/19	Minor stream. Add to anadromous catalog.
	302-22-110 Pumicestone Bay SE Stream	12 live pinks 150 coho 44,000 pink carcasses	9/19	Great pink stream. Possibly 75,000 pink tot. escapement, 30,000 probably normal escapement.
	302-22- E. Pumicestone Bay	30 live pinks plus 3,000 pink carcasses	9/19	Small stream. Add to anadromous catalog.
	302-22- NE Pumicestone Bay	200 pinks 2,000 pink carcasses	9/19	Braided stream, marginal habitat. Add to anadromous catalog.
	302-22-140 NW Pumicestone Bay	No fish	9/19	Too steep for salmon. Delete from anadromous catalog.

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Appendix A.1. (page 6 of 7)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
	302-22-150	100 pinks 10,000 pink carcasses	9/19	Long lagoon
	302-22-10 Spray Cape	20 pinks 50 pink carcasses	9/19	Marginal salmon stream.
	302-23-30 S. Skan Bay (302-13-03)	25 pink carcasses	9/19	Marginal salmon stream.
	302-23-41 E. Skan Bay (302-13-04)	225 sockeye 8,000 pinks plus 7,000 pink carcasses	9/19	Shoal spawning pinks. 60 bright sockeye.
	302-23-60 NE Skan Bay (302-13-05)	No fish	9/19	Carcasses flushed out? Should have fish.
	302-23-70	No count	9/19	Photo. Sockeye lake, outlet over boulders on beach, requires further observation.
	302-24-10 Makushin Bay	No fish	9/19	Little potential as a salmon stream.
	302-24-20 Head of Nagging C.	Many pink carcasses No count	9/19	Photograph only.
	302-24-	Pink carcasses No count	9/19	Small stream. Photograph only, carcasses may have come from 302-24-20.
	304-24- (302-14-06) 1 mile NE of 302-24-20	Pink carcasses No count	9/19	Marginal stream. Photograph only. Add to anadromous catalog.
	302-24-30 Udgmak Cove	Pink carcasses No count	9/19	Rehabilitation? Install fish pass over impassable cataracts 200 yards upstream.
	302-24-50 N. Cannery Bay	650 pinks plus 5,500 pink carcasses	9/19	Most fish produced in small side channel.
	302-24-40	No fish		Braided stream, not suitable for salmon.
	302-24-60	Many pink carcasses No count	9/19	Photo only. Potential for habilitation, Head of Portage Bay falls at 450 yards.
	302-24-70 (302-14.03) Portage #3	3,000-5,000 pink carcasses No count.	9/19	Photo only.
	302-24-80 (302-14.04) Portage #2	2,400 pinks Few pinks, no count	8/12 9/19	^{2/} Photo only.

-Continued-

Appendix A.1. (page 7 of 7)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^{1/}
	302-24- (302-14.15) Portage #1	Few pinks, no count	9/19	Photo only. Marginal salmon stream, add to anadromous catalog.
	302-24-100 (302-14.16) Humpback #3	173,000 pinks 40,000 pinks 52,000 pink carcasses	9/03 9/19	^{2/} 50,000-70,000 adequate escapement.
	302-24-110 (302-14.16) Humpback #2	37,000 pinks 13,500 pinks 10,000 pink carcasses	9/03 9/19	^{2/} Counted 2/3 of system.
	302-24-120 (302-14.08) (Glacier Valley)	17,500 pinks 24,000 pinks	9/03 9/19	^{2/} Estimate 50,000 in stream. Late run fish still coming.
	302-24- (302-14.20) Makushin Village	600 pinks No count	9/03 9/19	^{2/} Poor stream, photo only, log across stream.
	302-23-80 (302-13.10) Volcano Bay Lakes	500 sockeye No count	9/03 9/19	^{2/} Photo only.
	302-23-90	No count	9/19	Photo only, marginal stream.
	302-23-100	No fish	9/19	Delete from anadromous catalog, too steep.
	302-23-10	No fish	9/19	Delete from anadromous catalog, too steep.
	302-23-20	No fish	9/19	Delete from anadromous catalog, too steep.
	302-25-30 (302-15.05) Driftwood Bay	6,800 pinks 1,500 pinks	9/03 9/19	
	302-25-40, 41 & 42 McLees Lakes	83 sockeye plus 200 sockeye carcasses	9/19	Rich algae bloom, lake opaque green, poor visibility, possible low count.

^{1/} Aerial survey unless otherwise noted.

^{2/} Management biologist's peak aerial survey.

Appendix A. 2. Umnak Island salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^y
Umnak Island	302-21-80 Otter Blight	200 pink, 25 coho	8/17	Foot survey ^y
	302-21-90	No fish	8/17	See text. Reasonable looking streams coming off volcano, virtually sterile, of fish, consider for deletion.
	302-21-100	No fish		
	302-21-110	No fish		
	302-22-170	No fish		
	302-22-150	No fish		
	302-22-140	No fish		
	302-22-130	No fish		
	302-22-120	No fish		
	302-22-120	No fish		
	302-22-111	No fish		
	302-22-110	400 pinks 100 dolly varden	8/17	Pinks in small lagoon. 200 pinks in W. fork.
	302-22-100	6 pinks	8/17	Good looking stream, hardly any fish.
	303-10-300	No fish	8/17	Delete from anadromous catalog.
	303-10-290	80 pinks dolly varden	8/17	Few fish for this type of stream - most fish glacial water of 5 fork and outlet.
	303-10-280	No fish	8/17	Delete from anadromous catalog.
	303-10-270	No fish	8/17	Delete from anadromous catalog. Dry gullies.
	303-10-260	No fish		
	303-10-250	No fish		
	303-10-230	No fish		
	303-10-220	No fish		
	303-10-210	No fish	8/17	Delete from anadromous catalog. Cliff
	303-10-130	No fish	8/17	Delete from anadromous catalog. Too steep
	303-10-100	No Fish	8/17	Delete from anadromous catalog. Too steep
	302-21-40	No fish	8/17	Delete from anadromous catalog.
	303-21-30 Traders Cove	25,000 pinks 100 coho? off mouth dolly varden	8/18	Sockeye reported from this stream.
	303-21-20 Driftwood Bay	2,100 pinks	8/18	Sockeye reported from this stream.
	303-21-15	No fish	8/18	Stream blocked by beach
	303-10-100 1.25 mi. E. of Ashishik Pt.	No fish	8/17	Steep grade, heavy flow - delete from anadromous catalog.
	303-10-50 Cape Tanak	No fish	8/17	

-Continued-

Appendix A.2. (page 2 of 3)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
Southern 1/2 of Umnak Island	303-10-40	8,500 pinks (4,000 at mouth)	8/17	Steep grade, heavy flow, amazing to find fish.
	303-10-20	13,500 pinks	8/17	Steep grade, heavy flow, best escapement on north 1/2 of island
	303-32-210 Sheep Creek	3,305 pinks 5 coho, 11,000 pinks, 15 sockeye	8/18 8/21	Foot survey. Aerial survey more extensive.
	303-32-180	No salmon, few dolly vardeen.	8/18	
	303-32-100	No salmon, few dolly vardeen.	8/18	
	303-32-170 Okee Bay	13,500 pinks	8/18	
	303-32-160	44,000 pinks (1,500 at mouth)	8/18	Rehabilitation: fish pass over shallow falls, upper river open additional 1-1/2 miles of spawning area, chum and coho reported here.
	303-32-150	No fish	8/18	Empties into sand.
	303-32-140 Black Creek	No fish	8/18	Braided stream heavy bed load - silty
	303-32-130	No fish	8/18	Volcanic influence. No salmon potential.
	303-32-40	No fish	8/18	Volcanic influence. No salmon potential.
	303-32-30	2,800 pinks Few coho? dolly vardeen	8/18	
Umnak Island West Side	303-32-20	No fish	8/18	Braided stream - unstable unsuitable for salmon.
	303-10-350 Geyser Bight	40,180 pinks dolly vardeen	8/18	Excellent run of salmon.
	303-10-310 Hot Springs Cove	28,460 pinks 1 coho dolly vardeen	8/18	Coho reported in good numbers here.
	303-22-70 Pantov Cove	No fish	8/18	Not a suitable stream for salmon, delete from anadromous catalog.
	303-22-60 Thumb Point	59 pinks, 120 sockeye 2 coho, dolly vardeen	8/18	

-Continued-

Appendix A.2. (page 3 of 3)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
Umnak	303-22-50 Russian Bay	15,000 pinks	8/18	Not yet at peak spawning.
	303-22- 2-1/4 S. of 302-22-50	15,350 pinks	8/18	
	303-22-25	21,700 pinks	8/18	Silty water.
	303-22-20	No fish	8/18	Braided/swift/silty heavy bed load. Unsuitable for salmon.
	303-22-15	No fish		
	303-22-10	No fish		
	303-21-120 Amos Cove	21,100 pinks dolly varden	8/18	Coho reported here.
	303-21-110	850 pinks	8/18	
	302-21-90	4,200 pinks dolly varden	8/18	
	303-21-70	16,700 pinks dolly varden	8/18	Coho reported here, rehabilitation-fish pass over cataract at 1/2 mile would open up 1 mile of spawning area above.
	303-21-50 Lookout Cove	8,300 pinks	8/18	
	303-32-220 Nikolski Village lakes	Estimated 670 to 1,000 sockeye in 3 lakes Actual count 200	8/18	Poor visibility, windy, turbid water. Davenport estimated number of sockeye based on number of spawning reeds. Important lake for subsistence.
		Estimated 310 sockeye Counted 80	8/21	Visibility poor, very windy, turbid water.

¹ Most streams on the northern half of the island were spring fed from volcano's. They have few, if any fish, possibly a function of abrasive spawning substrate, dissolved chemicals, or gases.

² Aerial survey unless otherwise noted.

Appendix A. 3. Amlia Island salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments"
Amlia	305-53- 1 mi. east of 305-53-20	11,000 pinks Few carcasses	8/23	Add to anadromous catalog.
	305-53- 4.25 mi. east of 305-53-20	3,100 pinks	8/23	Add to anadromous catalog.
	305-53- 7.1 mi. east of 305-53-20	400 sockeye 5,300 pinks	8/23	Add to anadromous catalog.
	305-53- 8.25 mi. east of 305-53-20	20 pinks	8/23	Poor spawning area, add to anadromous catalog.
	305-53- 6.6 mi. west of USGS marker "Brat"	120 pinks 8 sockeye	8/23	Add to anadromous catalog.
	305-53- 5.2 mi. west of USGS marker "Brat"	3,800 pinks	8/23	Add to anadromous catalog.
	305-53- 5 mi. west of USGS marker "Brat"	100 pinks 15 sockeye	8/23	Add to anadromous catalog.
	305-21-40	500 pinks at mouth	8/23	Coho reported here, important subsistence stream.
	305-21-50, 60, 70	No salmon	8/23	Mouths blocked by beach. #50 reported to have sockeye.
	305-21- 80, 90	No salmon	8/23	Unsuitable stream for salmon.
	305-21-111	6 pinks	8/23	Marginal stream.
	305-21- 1.5 mi. west of 305-21-120	80 pinks	8/23	Minor stream, add to anadromous catalog.
	305-52-110	6,800 pinks 30 sockeye (just turning color)	8/23 9/16	Sockeye may have been bright and mixed with pinks on earlier survey.
	305-52- .3 mi. west of 305-52-110	175 pinks	8/23	Add to anadromous catalog.
	305-52-120	2,000 pinks (350 intertidal) 750 chum or coho	8/23	

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Appendix A.3 (page 2 of 3)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments"
	305-52- 1.5 mi. west of 305-52-140	8,000 pinks	8/23	Add to anadromous catalog.
	305-52- .8 mi. west of 305-52-140	150 pinks	8/23	Add to anadromous catalog.
	305-52-140	12,500 pinks (11,000 in lagoon)	8/23	Coho reported here.
	305-53-10	3,700 pinks	8/23	Coho reported here.
	305-53-20	2,500 pinks	8/23	
	305-52-110	7,000 pinks	8/24	Foot survey
	305-53- 2-1/4 mi. east of USGS marker "Brat"	50 pinks in mouth	8/24	Minor stream, add to anadromous catalog.
	305-22- 2.75 mi. east of USGS marker "Donna"	300 pinks (100 at mouth)	8/24	Minor stream, add to anadromous catalog.
	305-22- 1.6 mi. east of USGS marker "Donna"	2 pinks	8/24	Nice stream, few fish - periodically blocked by beach action? Add to anadromous catalog.
	305-22- 3/4 mi. west of USGS marker "Donna"	20 chums dolly varden	8/24	Add to anadromous catalog.
	305-22- 2.2 mi. west of USGS marker "Donna"	1,500 pinks Few chums?	8/24	Nasty weather, poor visibility, add to anadromous catalog.
	305-22 E. Sviechnikof Harbor	4,400 pinks (400 at mouth)	8/24	Add to anadromous catalog.
	305-22-40	No fish	8/24	Delete from anadromous catalog.
	305-22-30	750 pinks	8/24	Falls below lake, rehabilitation potential for fish pass?
	305-22 East stream of Small Bay 2.2 mi. NE of USGS marker "Blue"	25 pinks 2 chums	8/24	Minor stream, add to anadromous catalog.
	305-22- West stream of Small Bay 1.75 mi. NE of USGS marker "Blue"	3,500 pinks	8/24	Small stream, add to anadromous catalog.
	305-22-10	40 pinks	8/24	Partial blockage by logs. Rehabilitation.

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Appendix A.3 (page 3 of 3)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
	305-21- 4.5 mi. east of USGS marker "Sharp"	490 pinks 160 chums	8/24	Add to anadromous catalog.
	305-21- 3.5 mi. east of USGS marker "Sharp"	2,500 pinks	8/24	Rehabilitation potential good for fish pass over 4' falls, add to anadromous catalog.
	305-21- 3/4 mi. east of USGS marker "Sharp"	10,300 pinks	8/24	Add to anadromous catalog.
	305-21-120	1,550 pinks	8/24	
	305-52-90 Hungry Bay	18,000 pinks (2,000 in mouth)	8/24	
	305-52-60	11,000 pinks 1,000 at mouth	8/24	
	305-52- East Creek 1.3 mi. west of 305-52-60	3,500 pinks	8/24	Add to anadromous catalog.
	305-52- West Creek 1.5 mi. west of 305-52-60	200 pinks	8/24	Minor stream, add to anadromous catalog.
	305-52-40	6,200 pinks (1,000 off mouth) 7,100 pinks	8/24	Foot survey

^{1/} Aerial survey unless otherwise noted.

Appendix A.4. Atka Island salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
Atka Island (North end)	305-42-260 Korovin Lake and connecting tributaries	11,650 pinks 66 sockeye	8/23	Windy, turbid water, poor visibility. Lake important for local subsistence. (180 pinks and all sockeye in lake.)
		200 pinks 320 sockeye in lake	8/24	Recount lake only. Good visibility.
		140 sockeye (10 fresh and bright) 51 pinks in lake 380 pinks	9/17	Recount lake and outlet. Windy, poor visibility. coho or large bright sockeye in outlet.
	305-42-280	1,600 pinks	8/23	Fish in clear short tributary on north side of muddy main stream.
	305-42-290 Old Harbor	15,700 pinks 484 chums (100 were carcasses) coho fingerlings.	8/23	Foot survey
	305-42- 1.1 mi. SW of 305-42-260	25 pinks	8/23	Marginal stream, add to anadromous catalog.
	305-42- 1 mi. north of 305-42-26	17 pinks	8/23	Marginal stream, add to anadromous catalog.
	305-42-250 Martin Harbor	23,170 pinks (1,500 at mouth)	8/23	
	305-42- 1 mi. NE Sarana Cove	300 pinks	8/23	Add to anadromous catalog.
Atka Island (North Central)	305-42- E. side of Sarana Cove	1,800 pinks (300 at mouth)	8/23	Potential for few sockeye, stream blocked by abandoned fish trap, no fish can reach lake. Add to anadromous catalog.
	305-42-230 Sarana Cove	26,000 pinks (4,000 at mouth, 1,500 carcasses)	8/23	Sockeye reported here None seen.
	305-42-220 Sarana Cove	10,000 pinks	8/23	
	305-42- 1 mi. NW of 305-42-220	6,200 pinks	8/23	Add to anadromous catalog.
	305-42- 2.5 mi. east of Egg Point.	1,000 pinks	8/23	Add to anadromous catalog.
	305-42-200 East Egg Bay	13,000 pinks	8/23	

-Continued-

Appendix A.4. (page 2 of 6)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
Atka Island (North Central)	305-42-160 West Egg Bay	No salmon	8/23	Not suitable for salmon.
	305-42-170	No salmon	8/23	Not suitable for salmon.
	305-42- 2.5 mi. east of Banner Point.	100 pinks	8/23	Marginal stream, add to anadromous catalog.
	305-42- 2 mi. east of Banner Point.	400 pinks 2 coho	8/23	Add to anadromous catalog.
	305-42- North Banner Cove	18,000 pinks 800 coho?	8/23	Add to anadromous catalog. (180 pinks and all sockeye in lake.)
	305-42-130 Banner Bay	20,000 pinks	8/23	
	305-42- 1 mi. SW USGS marker "Sobo"	150 pinks (100 off mouth)	8/23	Rehabilitation: fish pass at cataract at 1/2 mile. Add to anadromous catalog.
	305-52-162 "Spikes'Camp"	12,000 pinks (4,000 at mouth)	8/23	Adequate escapement 5,000 pinks. Add to anadromous catalog.
	305-52-150 Army Dock creek	28,200 pinks, coho fry and fingerlings, dolly varden.	8/24	Foot survey. Excellent stream. Coho reported here.
	305-52-160 Range creek	10,150 pinks	8/24	Foot survey, spawning at peak
	305-52-210	390 pinks	8/24	Poor stream.
	305-52- .3 mi. north Cape Shaw	1,000 chums 360 pinks	8/24	South stream good chum system, north stream braided, silty, poor salmon habitat, add to anadromous catalog.
	305-52- Stream behind Atka Runway	62 pinks	8/24	Could handle a few hundred coho - historicsubsistence stream - rehabilitation 12' - 15' fish pass needed for washed out culvert, add to anadromous catalog
	305-51- North stream in Old hHarbor (Korovinski Lagoon) 2.3 mi. north of 305-42-290	86,000 pinks (may have been 100,000)	8/24	Getting dark, poor visibility - major salmon stream on island. Add to anadromous catalog.
	305-42-290	15,500 pinks 4,000 chums	8/24	

-Continued-

Appendix A.4. (page 3 of 6)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments"
Atka Island (Southwest)	305-41- 1/2 mi. west of 305-41-40 Podosopachni Bay	40 pinks	8/24	Add to anadromous catalog.
	305-41-10 South end of Wall Bay	35 pinks dolly varden	8/24	
	305-41-30 Wall Bay (and 3 adjacent streams)	No salmon	8/24	Stream too small for salmon.
	305-42- 1.25 mi. east of 305-42-30	5,175 pinks 1 sockeye	8/25	Foot survey, add to anadromous catalog.
	305-41- 1 mi. west of 305-41-50 Kovurof Bay	13 pinks	8/25	Foot survey, add to anadromous catalog.
	305-41-50 E. Kovurof Bay	5,175 pinks 1 sockeye	8/25	Foot survey.
	305-42-30	No fish	8/25	Foot survey, falls at tide water, delete from anadromous catalog.
	305-42-30 1.3 mi. east of 305-42-30	5,000 pinks 200 sockeye	8/25	Foot survey, add to anadromous survey.
	305-42- 2 mi. east of 305-42-30	700 pinks 2 sockeye Large dolly varden	8/25	Add to anadromous catalog.
	305-42-50 Blue Fox Bay	27,000 pinks (2,000 - 3,000 pink carcasses, 100 pinks at mouth)	8/25	More fish than stream can handle.
	305-42- .8 mi. NE of 305-42-50	20 fish (small pinks or large dolly varden)	8/25	Marginal salmon stream, add to anadromous catalog.
	305-42 Series of lakes and stream 1.5 mi. SE of USGS marker "Gale" "Triple Lakes"	371 sockeye 1,000 pinks 2 coho	8/25	Would expect that this system could support more reds, perhaps later run?, add to anadromous catalog.
	305-42-90 West Arm Deep Bay	12,900 pinks 2,500 sockeye	8/25	Nice system.
	305-42- 1.3 mi. east of 305-42-30	470 sockeye 5,500 pinks	8/25	Add to anadromous catalog.

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Appendix A.4. (page 4 of 6)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^u
(South Central)	305-42-20 Bechevin Bay	404 pinks, coho fry and fingerlings	8/26	Minor stream, foot survey.
	305-41-30 SW Portage Lagoon	910 pinks, coho fry and fingerlings	8/27	Foot survey, peak escapement 8/25, additional 300-500 attempting to spawn intertidally at head of lagoon.
	305-41- 1.1 mi. NE of 305-11-30 - East side of Portage Bay	905 pinks, coho fry and fingerlings.	8/27	Foot survey, add to anadromous catalog.
	305-41- 1.4 mi. south of Stripe Point, Crescent Bay	No adult salmon Coho fingerlings	8/27	Partial stream blockage, not worth clearing, foot survey, add to anadromous catalog.
	305-41- 1.5 mi. east of Slope Pt. Crescent Bay	1,716 pinks	8/27	Foot survey, add to anadromous catalog.
		dolly varden 2,400 pinks	8/28	Aerial survey.
	305-31-60	30 pinks	8/27	Minor stream. 305-31-80, 90, 100
		No fish	8/27	Falls at beach, delete from anadromous catalog.
	305-31- 1.1 mi. east of 305-31-100	No salmon dolly varden	8/27	Short stream, add to anadromous catalog.
	305-31-110	No fish	8/27	Cataracts and falls, delete from anadromous catalog.
	305-31-120	46 sockeye 15,300 pinks	8/27	Coho reported here.
	305-31-130	45 pinks (20 at mouth)	8/27	
	305-32-10	140 pinks	8/27	^u
	305-32-20	200 pinks	8/27	^u
	305-32- Beaver Bay, 1.5 mi. north of 305-32-20	100 pinks	8/27	Minor stream, add to anadromous catalog. ^u
	305-32- Beaver Bay 2.2 mi. north of 305-32-20	50 pinks 4 coho	8/27	Minor stream, add to anadromous catalog. ^u

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Appendix A.4. (page 5 of 6)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^y
	305-32 1 mi. south of 305-32-40 (Beaver Bay)	25 pinks	8/27	Add to anadromous catalog. ^y
	305-32-30	450 pinks (100 pink carcasses) 2 coho	8/27	^y
	305-32- .3 mi. west of 305-32-40	30 pinks at mouth	8/27	Poor salmon habitat, add to anadromous catalog.
	305-32- .6 mi. west of 305-32-40	175 pinks (50 pink carcasses)	8/27	Add to anadromous catalog. Salmon may spawn earlier on south side of the island.
	305-32-70	2,500 pinks (300 pink carcasses)	8/27	Coho reported here.
	305-30-80	30 sockeye 4,375 pinks	8/27	
	305-32- 1/2 mile SE of 305-32-802	2,100 pinks	8/27	Add to anadromous catalog.
	305-32- .3 mi. SW of 305-32-90 (Explorer Bay)	400 pinks (25 carcasses)	8/27	Add to anadromous catalog.
	305-32-140	No fish	8/27	Falls at beach, delete from anadromous catalog
	305-32-90	11,000 pinks (2,500 first 1/4 mile)	8/28	Coho reported here.
(Southeastern)	305-32-290	11,000 pinks 105 pinks, 7 coho and 2 sockeye	8/28 9/17	Large number of coho reported here. Good coho stream.
	305-32- 1.7 mi. east of 305-32-290	75 pinks	8/28	Add to anadromous catalog.
	305-32-270	51,500 pinks(includes 2,000 off mouth) 1,500 carcasses, 1,350 chums, 4,500 pinks, 3 coho	8/28 9/17	Second largest run on the island, pools of pink eggs.
	305-32-260	No salmon	8/28	Rehabilitation potential for 20,000 sockeye spawners.

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Appendix A.4. (page 6 of 6)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
	305-32-240	38,000 pinks	8/28	Excellent pink stream, coho reported here.
	305-32-200	7,500 pinks	8/28	
	305-32-190	44,500 pinks (3,000 carcasses, 2,500 new fish on flats)	8/28	Excellent pink stream, coho and chum reported here.
	305-32 1.4 mi. SE of 305-32-190 South shore Vasilief Bay	1,500 pinks	8/28	
	305-32-170	No fish	8/28	High falls, delete from anadromous catalog.
	305-32- 1 mi. south of 305-32-170	100 pinks	8/28	Add to anadromous catalog.
	305-32-160	40 pinks	8/28	Might support a small run of reds.
	305-31-20	No salmon	8/28	Delete from anadromous catalog.

¹ Stream locations and observations from stream #305-32-10 to Beaver Bay may not be precise - work was done under conditions (fog, rain, heavy wind) which made navigation very difficult.

² Aerial survey unless otherwise noted.

Appendix A.5. Great Sitkin, Umak, Little Tanaga and Kagalaska Islands salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
Great Sitkin	306-11-40 Yoke Bay	1,900 pinks (300 at mouth)	8/28	
	306-11-40 Bugle Creek	No salmon	8/28	Mouth blocked by debris, small lagoon, mediocre stream.
	306-11- .2 mi. east of Sulfur Point	120 pinks	8/28	Very poor stream.
	306-70-180 L. Fox Cr.	400 pinks (300 bright)	8/28	Add to anadromous catalog.
	306-70-190 Fox Creek	5,000 pinks Few carcasses	8/28	
	306-70- Turmath Creek 1.4 mi. west of 306-70-190	300 pinks	8/28	Add to anadromous catalog.
	306-70- 1.25 mi. north of Cape Kiugilak	Few dolly varden	8/28	Add to anadromous catalog.
Umak	306-16- Umak Bight	230 pinks	8/28	Minor stream, add to anadromous catalog.
Little Tanaga	306-16-70 Scripps Bay	900 pinks 2 coho	8/29	
	306-70- .6 mi. east of Cape Lises	650 pinks Few carcasses	8/29	
Kagalaska	306-20- 1.8 mi. NW of USGS marker "Gull"	65 pinks (50 of which were in the mouth.)	8/29	Add to anadromous catalog.
	306-70-140 South Arm Cabin Cove	No fish	8/29	Falls directly into bay, delete from anadromous catalog.
	306-20-120 Galas Point	275 sockeye 60 large dolly varden	8/29	Very little spawning area, pinks and silvers Fish in upper portion of system.
		0 salmon dolly varden	8/29	Foot survey of outlet and lower lake, 20 recent storm? Water high and dark, poor visibility.
	306-20- Quail Bay	500 sockeye 2,300 pinks (below lake)	8/29	Foot survey, reds bright

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Appendix A.5. (page 2 of 2)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^v
Great Siltkin		700 sockeye for system 550 sockeye (200 in lake) 650 pinks	8/29	Aerial survey, excellent potential for rehabilitation of small falls at lake, add to anadromous catalog.
	306-70- South Laska Cove	880 pinks 350 of which at the mouth, includes 20 carcasses	8/29	Foot survey, fish in spawning formation in the intertidal area of the stream, add to anadromous catalog
	306-70- North Laska Cove	130 pinks	8/30	Add to anadromous catalog.

¹ Most streams on the northern half of the island have a volcanic influence and few, if any fish, possibly a function of abrasive spawning substrate or dissolved channels. Streams that were spring fed from volcano's had no fish.

² Aerial survey unless otherwise noted.

Appendix A. 6. Adak Island salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ^{1/}
Adak	306-20- .9 mi. SW Campers Point S. Campers Cove	7 pinks 10 dolly varden	8/29	Foot survey, should be more fish in this stream, add to anadromous catalog.
	306-20- 1 mi. W. Campers Point N. Campers Cove	190 pinks Many small dolly varden	8/29	Foot survey, stream in Camper Cove and Adak Bight have fewer salmon than would be expected for the quality of the streams, add to anadromous catalog.
	306-20- Head of Boot Bay	1,300 pinks (includes 100 bright, 100 carcasses)	8/29	Add to anadromous catalog.
	306-20- 1.6 mi. NE of 306-20-160	150 pinks Few carcasses	8/29	Very short stream, add to anadromous catalog.
	306-20-160 W. Boot Bay	3,000 pinks (includes 1,000 carcasses)	8/29	300 yards to 30' falls, excellent series of small lakes and streams above.
	306-20-230 Hidden Bay	7,700 pinks (includes 1,300 carcasses) 821 sockeye	8/29	Medium sized system, could support 2,000-3,000 or more sockeye.
	306-20-240 W. Arm Hidden Bay	No salmon Some dolly varden	8/29	Cataracts - difficult passage for sockeye rehabilitation - fish pass, good spawning area above shallow falls.
		15 sockeye	8/15	
	306-20- Beyer Bay, 8 mi. west of outlet to Lake Carolyn	1,200 pinks	8/29	Poor spawning area, add to anadromous catalog.
	306-20 Beyer Bay 25 mi. west of outlet to Lake Carolyn	7 pinks	8/29	Poor stream, add to anadromous catalog.
	306-30- Cataract Blight Outlet Lake Sabrina Lyn	150 pinks	8/29	Very short stream to falls. Add to anadromous catalog.
	306-30-110 Outlet Hatchet Lake	2,300 pinks (includes 1,000 carcasses)	8/29	Short stream
	306-70-30 Finger Bay	99,000 pinks (6,000 carcasses) 10,000 pinks (includes 4,000-6,000 carcasses)	9/01 9/01	Aerial survey Foot survey, tremendous escapement! Only 5/8 mile of stream to falls.
		45,000 pinks (30% fresh) carcasses not countable	9/14	Pools of eggs - many bright fish, dead of O ₂ depletion.

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Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ¹
	306-70- Outlet of Lake Leone	90 pinks	9/01	Foot survey - minor stream, add to anadromous catalog.
	306-50-140	3,700 pinks (includes 700 carcasses)	9/01	
	306-50-130	4,900 pinks (includes 800 carcasses)	9/01	
	306-50-120	36 pinks (includes 6 carcasses)	9/01	Almost no spawning area.
	306-50-90	800 pinks Few carcasses	9/01	
	306-50- .6 mi. NW of 306-50-90	170 pinks Few carcasses	9/01	Minor stream, add to anadromous catalog.
	306-50-150	44,000 pinks (1,000 at mouth, 7,000 carcasses included)	9/01	15,000 fish could service this stream.
	306-50-160	22,200 pinks (1,500 at mouth, 1,500 carcasses included)	9/01	
	306-40- 1.25 mi. NE of Lake Point	380 pinks No carcasses	9/01	Add to anadromous catalog.
	306-40-100	No fish	9/01	No salmon habitat.
	306-40-160	5,700 pinks (includes 1,200 carcasses)	9/01	Fish colored with fungus.
	306-40 North Arm Three Arm Bay	540 pinks (includes 100 off mouth, 50 carcasses)	9/01	Log jam at mouth, add to anadromous catalog.
	306-50- Expedition Harbor 4 mi. east of USGS marker "Boot"	200 pinks	9/01	Add to anadromous catalog.
	306-40-200	1,000 pinks (500 in lower 200 yards)	9/01	Possible coho stream.
	306-40-210	No fish	9/01	Stream covered by grass - poor visibility.
	306-50-70 Gannet Cove	57,500 pinks (includes 20,000 carcasses)	9/01	30,000 spawners would be ideal. pools of eggs from superimposition.

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Appendix A.6. (page 3 of 3)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ¹
	306-50-80 Lake Constant	3 sockeye	9/01	Falls close to bay - need removal or fish pass.
	306-50-90 Lake Andrew	No fish visible	9/01	Large numbers of Kokanee in lake. No Sea run sockeye. Rehabilitation by reopening outlet on north shore each spring.
	306-70-40 Little Thumb	44,500 pinks (30,000 very fresh and 4,500 carcasses included)	9/01	Excellent potential fish pass site.
	306-70-50 South stream Thumb Bay	7,000 pinks (includes 1,000 carcasses)	9/01	
	306-70-70 South East Scabbard Bay	6,250 pinks (includes 1,250 carcasses)	9/01	
	306-76-60	500 pinks	9/01	
	306-70- Sweeper Creek (Traffic Circle) North Sweeper Cove	200 pinks dolly varden	9/13	Marginal salmon stream, drains runway - add to anadromous catalog.
	306-70 Airport Creek 100 yards north of Runway B.	250 pinks dolly varden	9/13	Marginal stream - add to anadromous catalog.
	306-70- NavFac Creek	1,400 pinks 20-30 coho		USFWS observations, add to anadromous catalog.
	306-70-10 Clam Lagoon Creek 1-3/4 mi. north of Lagoon Outlet.	80 pinks (includes 50 carcasses)	9/13	Marginal creek, add to anadromous catalog.
	306-70-10 No Name Creek N. End of Lagoon	Est. 25-50 pinks (13 carcasses)	9/13	Marginal creek, add to anadromous catalog.

¹ In most streams on Adak 60% of pinks have saphrolignia (fungus) on their backs indicating longer period in fresh water than at Atka Island. Time of entry may be 7 - 10 days earlier for many streams.

Appendix A.7. Kanaga Island salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
Kanaga	307-12-140	No salmon	9/03	Stream cut off.
	307-12-150	No salmon	9/03	Stream cut off.
	307-12-160	2,400 pinks (includes 300 carcasses)	9/03	400 of fish very fresh, majority of fish near mouth.
	307-12-170	No salmon Few dolly varden	9/03	2 lakes over 200 acres cut off from ocean, exposed beach.
	306-50-30	25 pinks (20 off mouth, 5 in stream)	9/03	Poor stream, fish with fungus - hot spring on south fork.
	306-40-1.4 mi. SW of Naga Point	2 pinks Few dolly varden	9/03	Heavy stream vegetation, little spawning area, add to anadromous catalog.
	306-10-260 False Bay	15 pinks (includes 5 carcasses)	9/03	Poor stream.
	306-40-280	dolly varden	9/03	Short, not suitable for salmon.
	306-40-Head of Kanaga Bay	12,700 pinks (includes 2,000 carcasses)	9/03	Fish 2+ weeks past peak, only salmon stream of value on the island! 5-10% of fish with fungus, add to anadromous catalog.
	306-40-310	No salmon	9/03	Delete from anadromous catalog, falls at beach, poor stream.
	306-40-320	No salmon	9/03	Delete from anadromous catalog, falls at beach, poor stream.
	306-16-1.1 mi. NW of Cape Tusik	6 pinks dolly varden	9/03	Poor stream, add to anadromous catalog.
	307-16-20	50 pinks	9/03	
	307-16-30	No fish	9/03	No salmon habitat.
	307-16-40	No fish	9/03	No salmon habitat.
	307-16-50	3,250 pinks (includes 540 carcasses)	9/03	Fish have a lot of fungus, some carcasses 5-6 weeks old.
	307-16-240		9/03	Lake not surveyed due to very high winds. Possible sockeye system.

¹ Aerial survey unless otherwise noted.

Appendix A.8. Tanaga Island salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
Tanaga	307-12-50	745 pinks	9/05	Poor visibility due to wind, counting less than 1/2 of the fish.
		1,000 pinks (Includes 15 carcasses)	9/06	Recount. Fair visibility.
	307-11-90	5,500 pinks (includes 500 carcasses) Lots of dolly varden	9/06	Nice stream, pools of eggs at main stream junction.
	307-23-30	No fish	9/06	Steep, silty, unstable.
	307-23-50	240 pinks	9/06	Braided silty stream, fish only in small side channel.
	307-23-60	556 pinks	9/06	Water silty.
	307-23-70	17,500 pinks	9/06	40% of fish without fungus.
	307-23-80	No fish	9/06	Drift totally blocks outlet.
	307-23-90	39,650 pinks	9/06	
	307-23-100	No fish	9/06	Blocked by log jam, possible fish tracks mud at mouth of lake.
	307-23-110		9/06	Could not locate this stream.
	307-23- 1 mi. NE of Whip Is. Outlet of Figure 8 Lake	No salmon Few dolly varden	9/06	Lake is now predominantly a sedge meadow. Add to anadromous catalog.
	307-23 Head of Lash Bay	No salmon Few dolly varden.	9/06	Unlikely to be used by salmon. Add to anadromous catalog.
	307-23 First Bay south of Lash Bay	270 pinks	9/06	Short small stream, add to anadromous catalog.
	307-23-170	300 pinks (includes 30 carcasses)	9/06	
	307-16-300	No salmon Few dolly varden	9/06	
	307-16-290	No salmon Few dolly varden	9/06	
	307-16-280	450 pinks (includes 9/06 50 carcasses) 1 coho dolly varden		

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Appendix A.8. (page 2 of 2)

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
	307-16- .5 mi. south of 307-16-270	424 pinks coho(?) dolly varden	9/06	
	307-12-260	No salmon	9/06	Mediocre stream.
	307-12-60	No salmon dolly varden	9/06	
	307-12- Hot Springs Bay	1,450 pinks 5 coho Several dolly varden.	9/06	Add to anadromous catalog.
	307-12- Portage Bight 1.5 mi. east of Port Aries.	dolly varden	9/06	Small creek. Add to anadromous catalog.
	307-12- 1.75 mi. east of Port Aries.	dolly varden	9/06	Small lake outlet cut off by beach.

¹ Aerial survey unless otherwise noted.

Appendix A.9 Amchitka and Rat Islands salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
Amchitka	308-31-100	40 pinks (includes 20 carcasses)	9/11	100 yards to falls.
	308-31- .9 mi. NW of 308-31-100	50 pinks (includes 10 carcasses)	9/11	Small stream
	308-31-80 & 70	620 pinks (includes 200 carcasses)	9/11	Best stream on the island. Streams misnumbered, Actually east and west forks with a common outlet, fish in stream 3 weeks.
	308-31- 1.7 mi. E. of Blind Cape	130 pinks (includes 20 carcasses)	9/11	Add to anadromous catalogue.
	308-36- Head of Signal Cove	3 pinks, Dolly Varden	9/11	Add to anadromous catalogue.
	308-36- .5 mi. W. of 308-31-100	Dolly varden	9/11	Add to anadromous catalogue
	308-36-100	200 pinks	9/11	This stream could handle 2,000 pinks. possibly it is periodically blocked.
	308-36- E. & W. Streams of Sandy Cove	Dolly Varden	9/11	Add both streams to anadromous catalogue.
	308-36-130	110 pinks (includes 10 carcasses)	9/11	
	308-36- 2.2 mi. NW of Limpet Cr.	38 pinks (includes 20 carcasses, 10 bright pinks at the mouth). Dolly Varden	9/11	Add to anadromous catalogue
	308-36- 1.2 mi. NW of Limpet Cr.	Dolly Varden	9/11	Add to anadromous catalogue
	306-36- Limpet Creek	13 pinks Dolly Varden	9/11	Rehabilitation ? log jam at 25 yd. potential for 2-3,00 pinks . Add to Anadromous Cat.
	308-37- 4.7 mi. NW of Clam Pt.	2 pinks Dolly Varden	9/11	Add to anadromous catalogue
	308-37- 3.7 mi. NW of Clam Pt.	3 pinks (includes 2 carcasses) Dolly Varden	9/11	Add to anadromous catalogue
	308-37- 1 mi. NW of Clam Pt.	Dolly Varden	9/11	Add to anadromous catalogue
	308-37- Makarius Bay, 2.6 mi. SW of Clam Point	23 pinks	9/11	Add to anadromous catalogue

-Continued-

Appendix A.9. (page 2 of 2).

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
	308-32- .1 mi. SW of Constantine Pt.	10 pinks	9/11	Add to anadromous catalogue
Amchitka	308-32- 2.1 mi. NW of Kirilof Point	6 pinks	9/11	Add to anadromous catalogue
Rat Island	308-26-		9/12	No salmon streams found on entire Island. Most streams cut off from the sea. Probably resident dolly varden, potential for anadromous dolly varden but did not have time for intensive inspection.

¹ Aerial survey unless otherwise noted.

Appendix A.10. Semisopchnoi Island salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments ¹
Semisopchnoi				
	308-46-40 Fenner Creek	400 pinks (includes 100 carcasses	9/12	Marginal spawning 4-6% grade. 1/2 mile of stream to falls.
	308-46-10	No salmon dolly varden	9/12	Good stream, partially blocked mouth - not enough to block salmon.
	308-46-20		9/12	Doesn't exist. Delete from anadromous catalog.
	308-42- 1/2 ml. south of Northeast Point	No salmon dolly varden	9/12	Flows over boulders at beach, add to anadromous catalog.
	308-42-50	No fish	9/12	Cataract at beach.
	308-42- 2 ml. east of Truman Point	No salmon dolly varden	9/12	Add to anadromous catalog.
	308-42-80	1 salmon below mouth species unknown, dolly varden?	9/12	Small stream, flows over boulder beach.

¹ All aerial surveys.

Appendix A.11. Kiska Island salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
Kiska	308-12-60 Kiska Harbor	300 pinks (includes 15 carcasses)	9/09	
	308-12-50 Salmon Lagoon	8 sockeye (2 bright) dolly varden	9/09	Periodically closed by beach action.
	308-12-40	1 large dolly varden	9/09	Marshy - potential for coho.
	308-12-30, 20, 10	No fish	9/09	Too steep, delete from anadromous catalog.
	308-10-10			
	308-11-20	No fish	9/09	Potential for dolly varden, no salmon, land-Christine Lake locked lakes. Beach blocked by boulders.
	308-11-30	No fish	9/09	Potential for dolly varden, no salmon, land-Kiska Lakeslocked lakes. Beach blocked by boulders.
	308-11-40	dolly varden	9/09	No potential for salmon.
	308-11-16	3,550 pinks (includes 100 carcasses)	9/09	Only stream on west side with salmon.
	308-11-110, 120, 130 308-16-10	No fish	9/09	Too steep for salmon, cataracts, falls, etc. Delete from anadromous catalog.
	308-16-20	dolly varden	9/09	Not suitable for salmon.
	308-16-30	Large dolly varden	9/09	
	308-16-40	No fish	9/09	Falls at beach, delete from anadromous catalog.
	308-16-20	No fish	9/09	Inadequate flow, delete from anadromous catalog.
	308-16-30	No fish	9/09	
	308-16-40, 50 Corvie Bay	485 pinks (includes 9/09 150 carcasses)		Single stream with 2 forks, fish 3 weeks past peak.
	308-17-60	4 pinks 4 large dolly varden	9/09	Mediocre salmon stream.
	308-17-70	2,390 pinks (includes 450 carcasses)	9/09	
	308-17-80	280 pinks (includes 100 carcasses)	9/09	Peak spawning 2-3 weeks ago.

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Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
	308-17-90	4,000 pinks (includes 1,500 carcasses)	9/09	
	308-17-100	31,900 pinks (includes 19,000 carcasses) 1 chum, Large dolly varden	9/09	
	308-17-110 Jeff Cove	60 dolly varden	9/09	Land locked lake.
	308-17-120 Mutt Cove	No fish	9/09	Cataracts too steep, delete from anadromous catalog.
	308-17-130 Sargent Cove	137 pinks (includes 9/09 20 carcasses)		
	308-12-70 S. Kiska Harbor	1,326 pinks (includes 425 carcasses 20 coho 300 dolly varden	9/09	Peak spawning 3 weeks ago.
	308-12- Trout Lagoon	21 pinks dolly varden	9/09	Poor salmon system, add to anadromous catalog.

Fox actively preyed on live and dead pink salmon, banks of streams lined with pink carcasses that fox had pulled out to feed on heads. Largest number and concentration of fox seen during survey project.

Appendix A.12. Shemya Island anadromous streams, 1982 and 1983.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
Shemya Island	Laundry Lake	No fish	May/82 8/25/83	
	Lower Lake ^a	dolly varden dolly varden	May/82 8/25/83	Surveyed to saltwater, Dolly varden Surveyed to saltwater. Dolly varden
	Middle Lake	No fish	8/25/83	
	Upper Lake	dolly varden	8/25/83	Small sport catch dolly varden reported.
	Headquarters Lake	No fish	8/25/83	

- ^a Stream could have supported a small run of pink salmon prior to military buildup no data available. Good site for an incubator box to provide for recreational fishing for base service men.

Appendix A.13. Attu and Agattu salmon escapements, 1982.

Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
Aggatu ²	309-32-60 Ameria Bay	1,000-2,000 pinks (est.)	1st week Aug.	Salmon number based on conversations with USFWS biologists
	309-33-60, 70 Aga Cove	1,000-1,500 pinks (est.)	1st week Aug.	Salmon number based on conversations with USFWS biologists.
Attu ²	309-15-50 Holtz Bay O'Donnell Creek	1 pink 3,609 pinks (includes 457 carcasses)	8/13 9/04	Majority in lower mile.
	309-15-40 Addison Creek	482 pinks Coho fry dolly varden smolt	8/13	Receding flood waters, 480 pinks in tributary on south side of valley
		1,424 pinks (includes 52 carcasses) Rearing coho	9/04	5% bright fish, poor visibility for .2 of mile.
	309-15-30 Scout Canyon Creek	No fish	8/13	Too fast a flow, delete from anadromous catalog.
Chichagof Harbor	309-15-10 Lake Canirco	7 sockeye (paired) (1 sockeye, 2 pink carcasses) dolly varden 3,500 pinks in outlet stream (Canirco Cr.)	8/15	Poor visibility due to wind.
		205 pinks (includes 5 carcasses) 4 sockeye (paired)	8/16	Good visibility
		14 sockeye (includes 9 carcasses) 128 pink carcasses in lake 4,750 pinks (includes 250 carcasses in outlet stream)	8/23	Survey of complete system.
	309-15-10 Lake Cories	20 pinks at outlet dolly varden smolt, coho fry and smolt	8/15	
		3,500 pinks in outlet stream (Cories Creek)	8/15	
		7,000 pinks 1 sockeye carcass in outlet stream	8/16	

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Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
		538 pinks (includes 68 carcasses) in lake	8/23	No sockeye observed during study. This system has been reported to support a run of sockeye.
		7,000 pinks (includes 526 carcasses) in outlet stream		
	309-15- McKenzie Creek 1.6 mi. NW of 309-15-10 outlet	376 pinks dolly varden	8/16	Add to anadromous catalog.
Lake Nicholas Drainage 309-15-40	Lake Nicholas	125 sockeye (includes 62 pairs sockeye	8/04	Difficult to foot survey, North shore not surveyed.
	Lake Nicholas	172 sockeye (includes 6 carcasses) dolly varden smolt, coho smolt, sockeye smolt, resident dolly varden	8/12	Jumpers in lake, sockeye and pinks, paired and shoal spawning, probably more in center of the lake.
		530 sockeye, 12,500 pinks 2 coho (includes sockeye and 3 pink carcasses)	8/12	Peak spawning
	Basset Creek Trib. (Main Inlet Stream to Lake Nicholas)	1 pink 12 pinks	8/04 8/12	Flooded, heavy stream load
		7,377 pinks (includes 762 carcasses)	8/04	
	Saranna Creek (Lake Nicholas Outlet)	2,500 pinks	8/04 8/12	Not surveyed.
Massacre Bay	309-15- Alexai Point Cr. 1 mi. N. of Alexai Point	847 pinks (includes 20 carcasses)	8/23	Add to anadromous catalog.
	309-15- East Massacre Cr. 8 mi. NE of 309.15-30	280 pinks (includes 17 carcasses)	8/21	80% paired, add to anadromous catalog.
	309-15-30 Henderson River System	7,201 pinks	8/02	Some sections difficult to count, slightly muddy.
		47,797 pinks (includes 33 carcasses) 3 coho dolly varden, coho smolt	8/17	Recent high water, river very dark, difficult to count some areas.
		1 chum, 12 coho	9/12	Not a survey, checking for presence of chum and coho
		3 coho 210 dolly varden	10/14	3 coho taken with sport tackle.

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Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
(Massacre Bay)	Lake Elwood	400 pinks, 9 sockeye (includes 1 sockeye, 1 pink carcass)	8/17	
	Elwood Creek	1,080 pinks (includes 1 pink carcass) Coho and dolly varden smolt	8/18	
		7 sockeye (includes 4 carcasses)	8/23	
	309-15- Navy Town Creek 9 mi. NE of 309-15-40	840 pinks (includes 131 carcasses)	8/26	Debris and culvert at mouth, fish can only pass at high water - clearing could increase accessibility. Add to anadromous catalog.
	309-15-40 Peaceful River	4,520 pinks	7/29	Poor visibility, 1 section stream difficult to count.
		11,405 pinks	7/31	Same as above.
		24,490 pinks	8/06	River flooded yesterday 1' high, fair visibility. 17,000 pinks in lower 1/2 mile
		50 pinks 1 coho	8/10	Partial count, upper river 3.5-4 mile.
		33,042 pinks (includes 370 carcasses)	8/19	Survey entire system all tributaries first .6 mile difficult to count. Peak of the run.
Casco Cove	309-15- Kingfisher Creek 1.1 mi. SW of 309-15-40	4,600 pinks	8/12	Dam at .6 mile, add to anadromous catalog.
	309-15- S. Casco Cove Lakes and Stream .75 mi. SE of Kingfisher Creek	458 pinks 10 sockeye (includes 7 pink and 2 sockeye carcasses)	8/12	Add to anadromous catalog.
Temnac Bay	309-25- Rocky Point Cr.	1,464 pinks (includes 309 carcasses)	8/13	Add to anadromous catalog.
	309-25-50 George Creek	200 pinks	8/10	Steep high rate of flow, poor salmon stream.
	309-25-40 Temnac River	110 pinks Bright fish	8/07-09	Poor visibility, 3' above normal silty - unable to count lower 3 miles
		6,585 pinks (includes 35 carcasses)	9/01	Partial survey, 85% of spawning area - [expanded est. 7,747] river 4' - 5' lower than 8/09

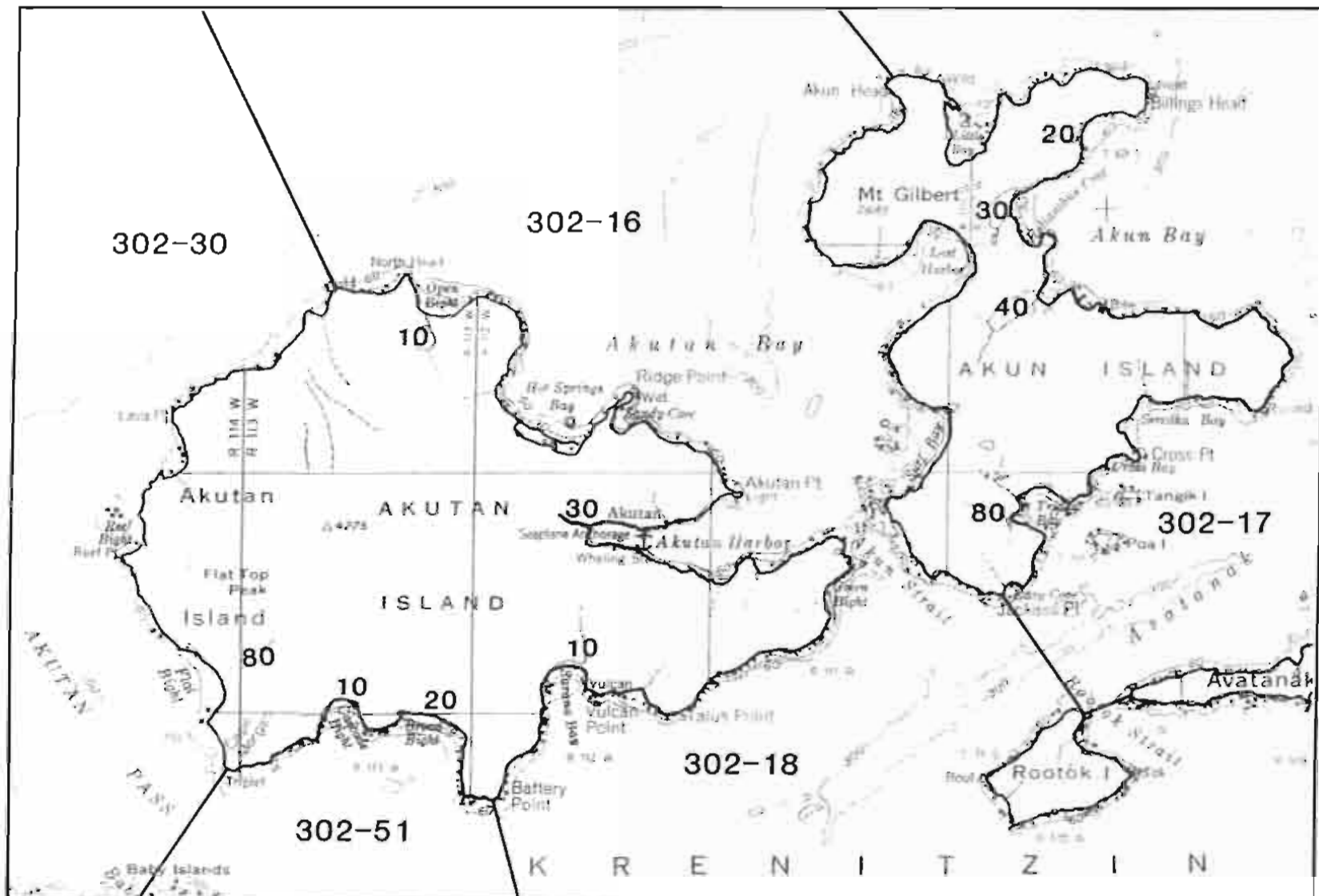
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Appendix A.13. (page 4 of 4)

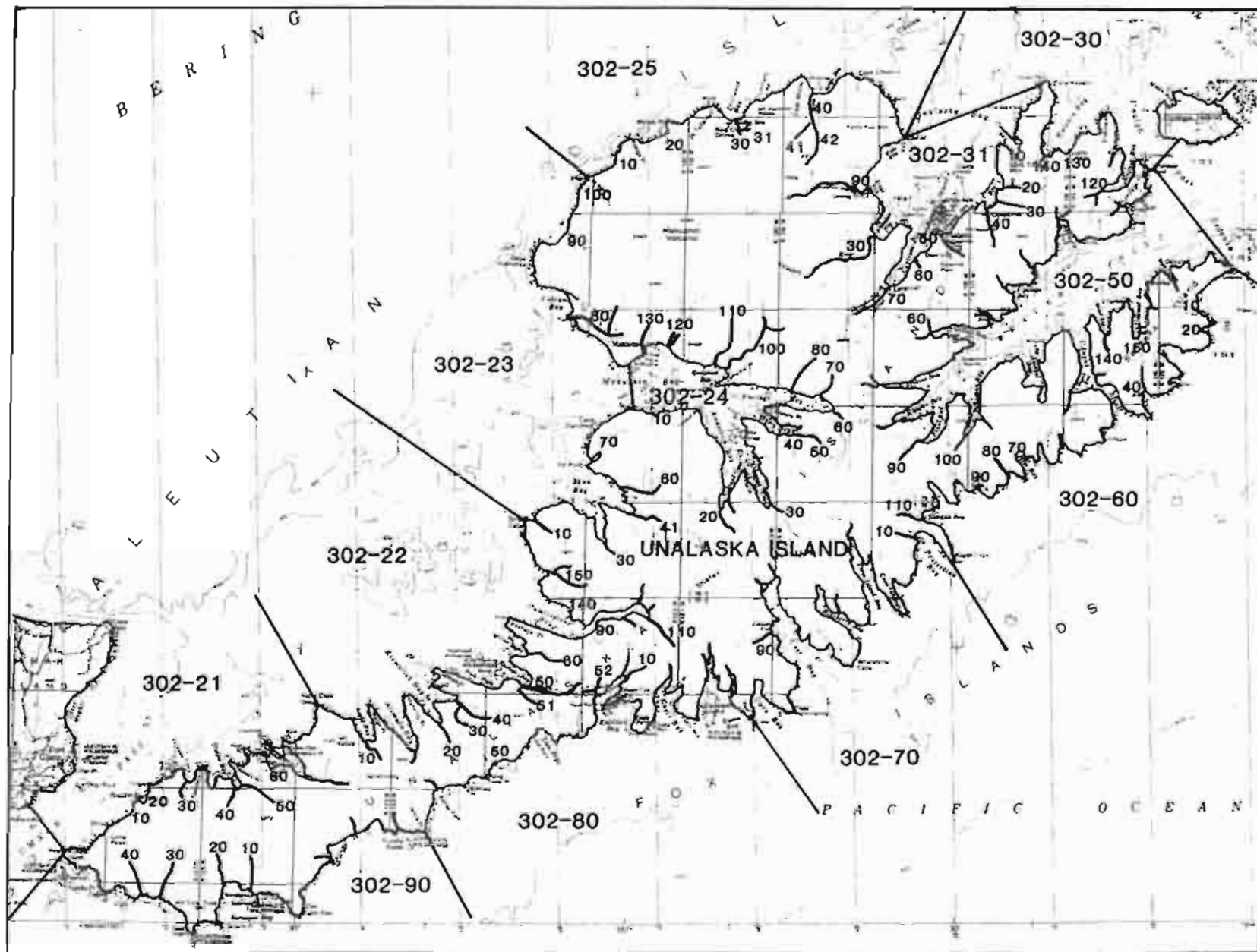
Island	Stream No. or Location	Number of Salmon Observed by Species	Date	Additional Comments
	309-25-30 Leflter Creek	1,313 pinks (includes 104 carcasses)	8/31	
Temnac Bay	309-25-20 Kaufman Creek	2,624 pinks (including 23 carcasses)	8/29-30	70% of fish paired and spawning.
Abraham Bay	309-22-30 Abraham R.	1,565 pinks dolly varden rearing	8/09	3 schools of fish, high flow - semi-braided, poor spawning area.
309-22-30	Little Abraham	50 pinks Few dolly varden	8/09	Better spawning area than Abraham River, potential for more fish, possibly too early.

¹ No survey was made of Agattu Island, salmon numbers are based on staff observations of stream morphology and USF&WS observations. Most streams on the island terminate with falls near the beach. The escapement for Agattu island was probably larger. Seven additional salmon streams were identified in a 1989 field with study (Mary Farout, USFWS, personal communication, Kenai.)

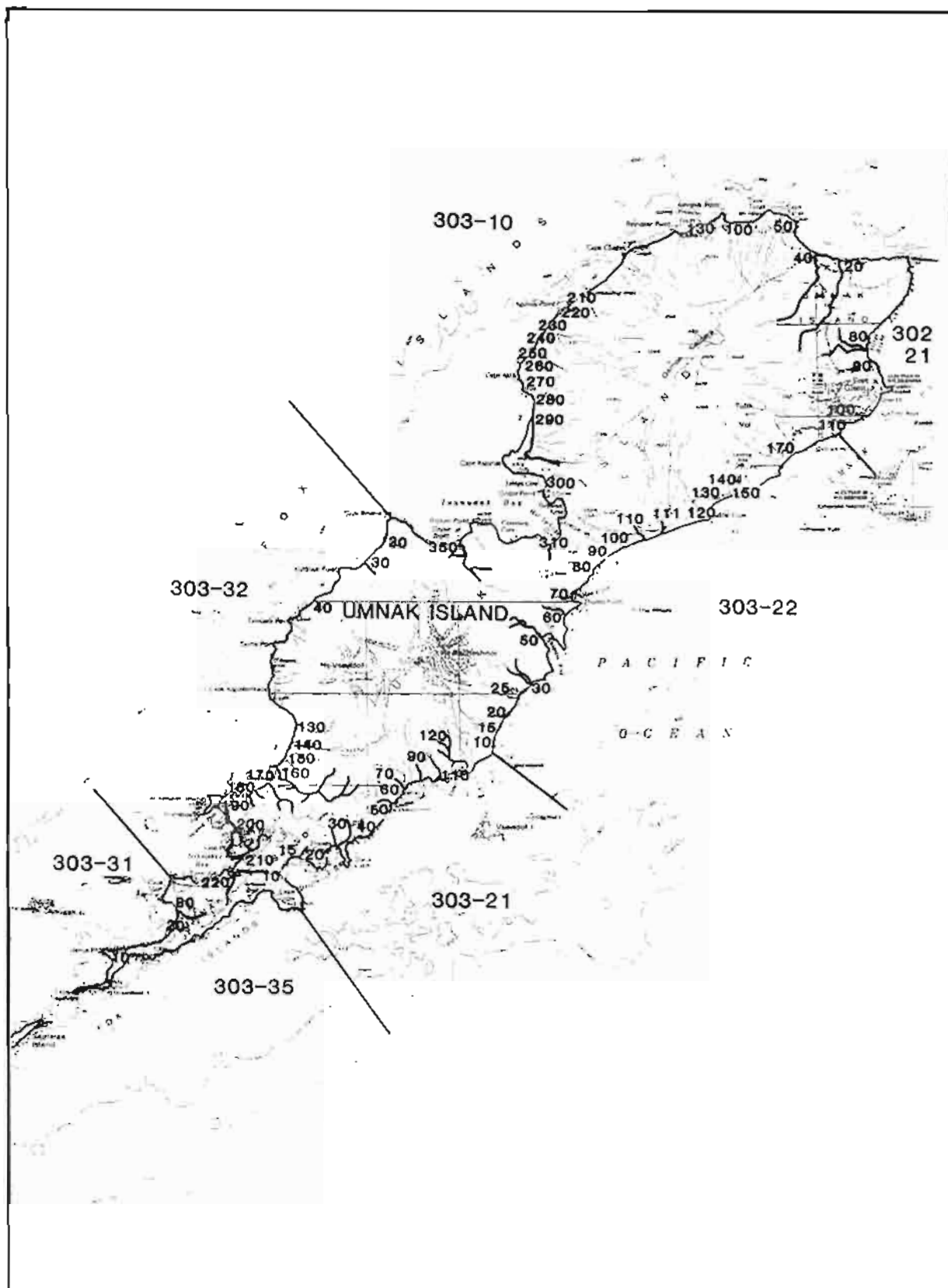
² All foot surveys, includes 40% of island's streams.



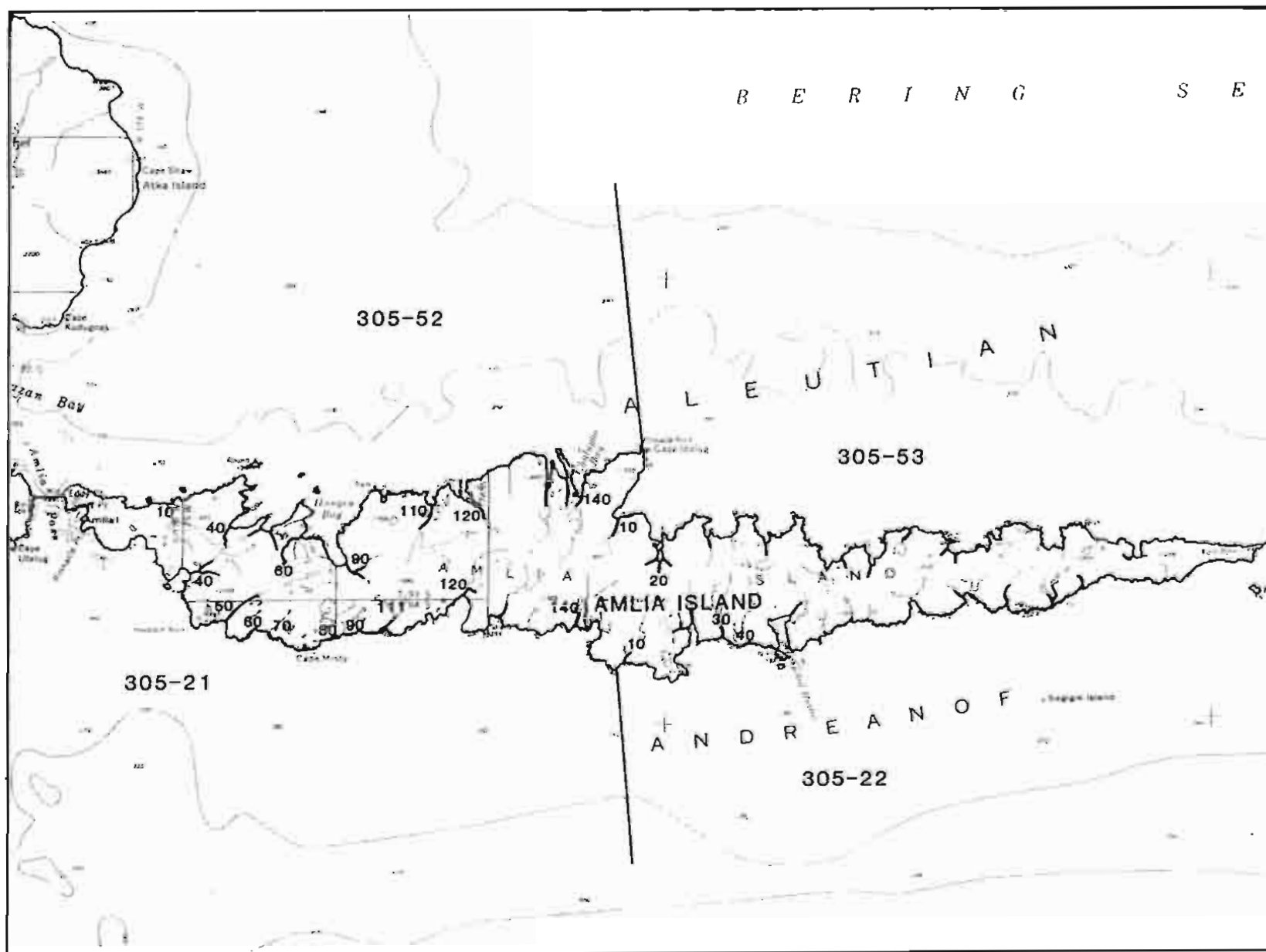
Appendix B1. Akutan Island salmon streams



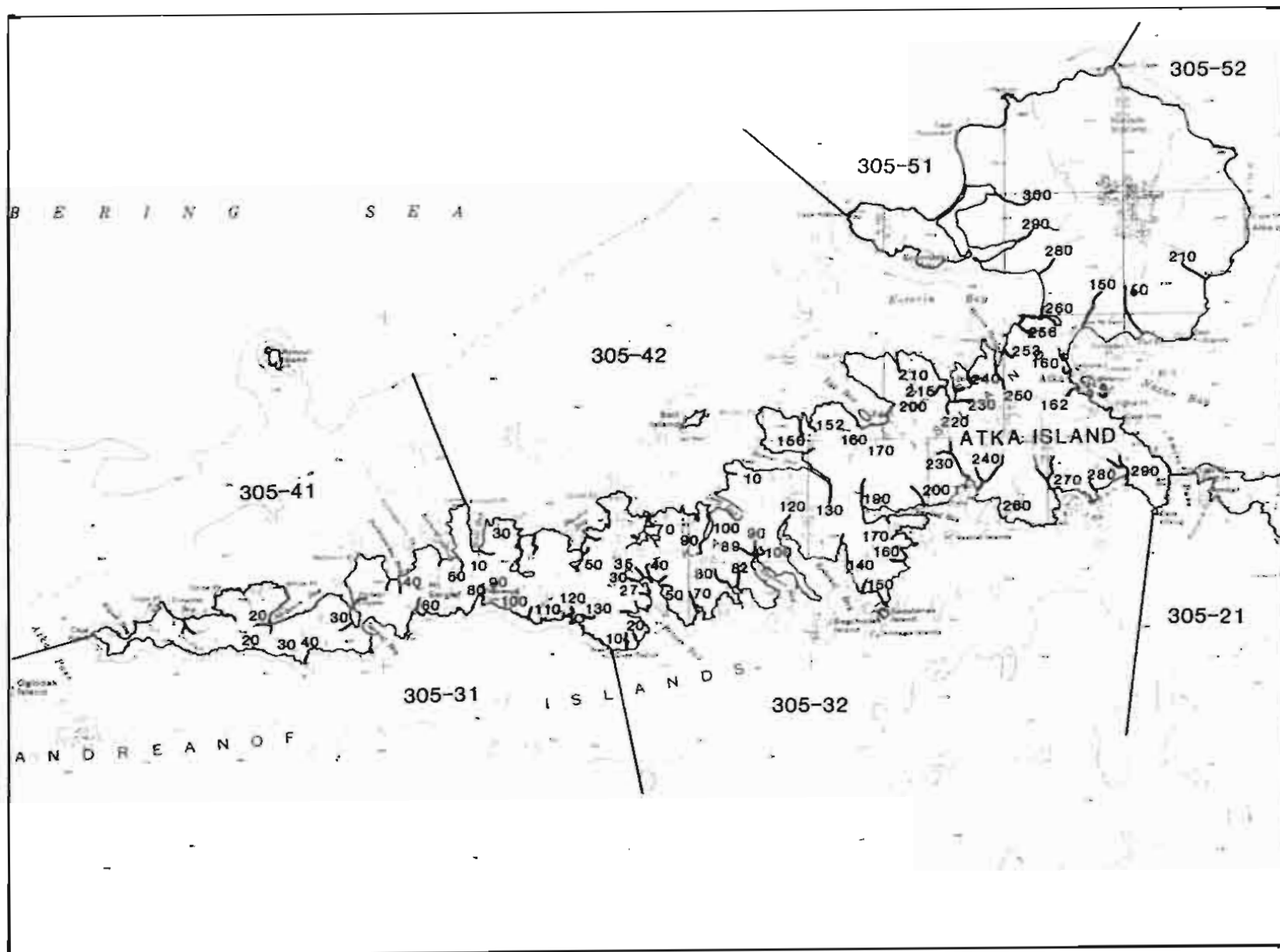
Appendix B2. Unalaska Island salmon streams



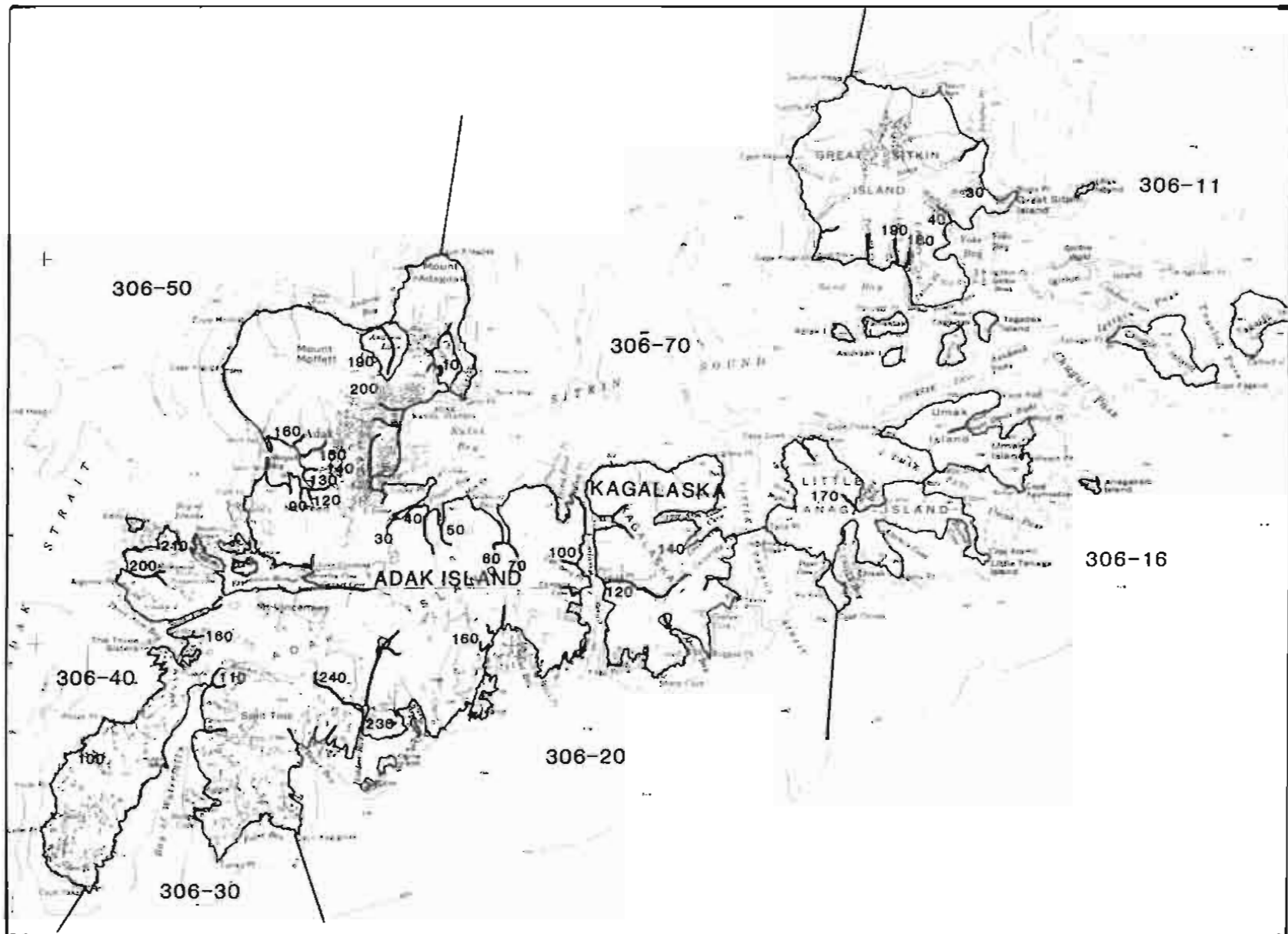
Appendix B3. Umnak Island salmon streams



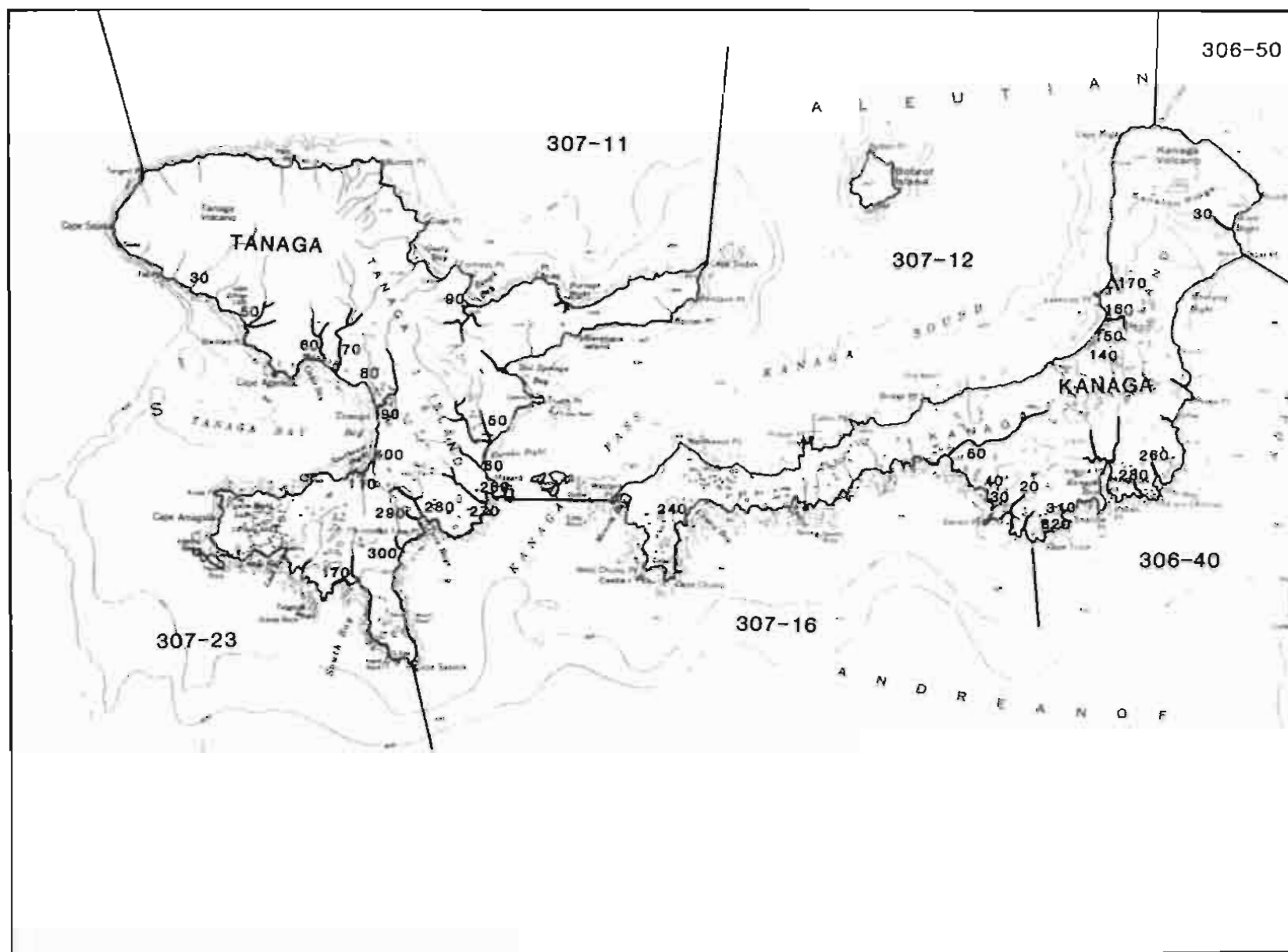
Appendix B4. Amlia Island salmon streams



Appendix B5. Atka Island salmon streams

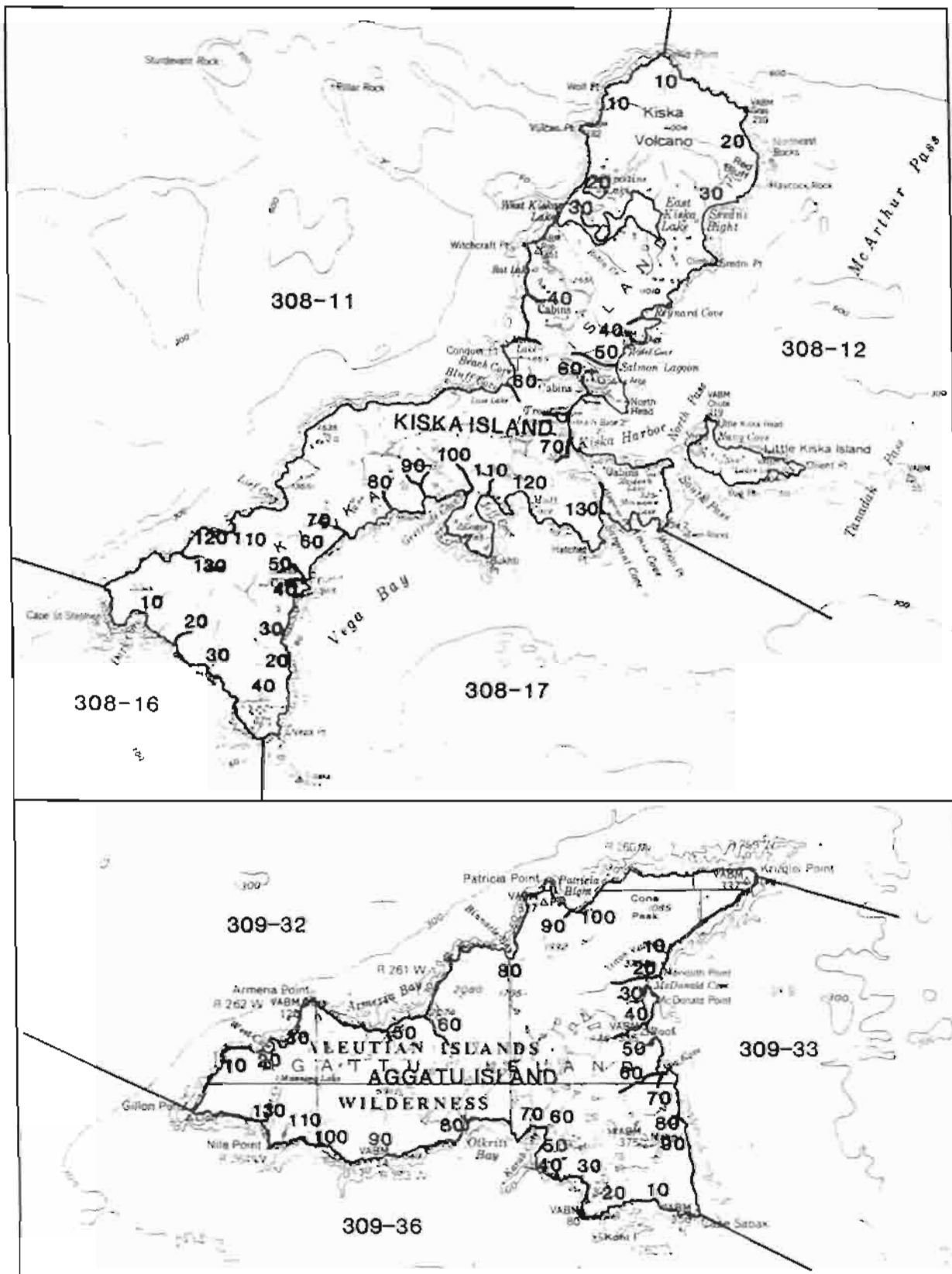


Appendix B6. Adak and adjacent islands salmon streams

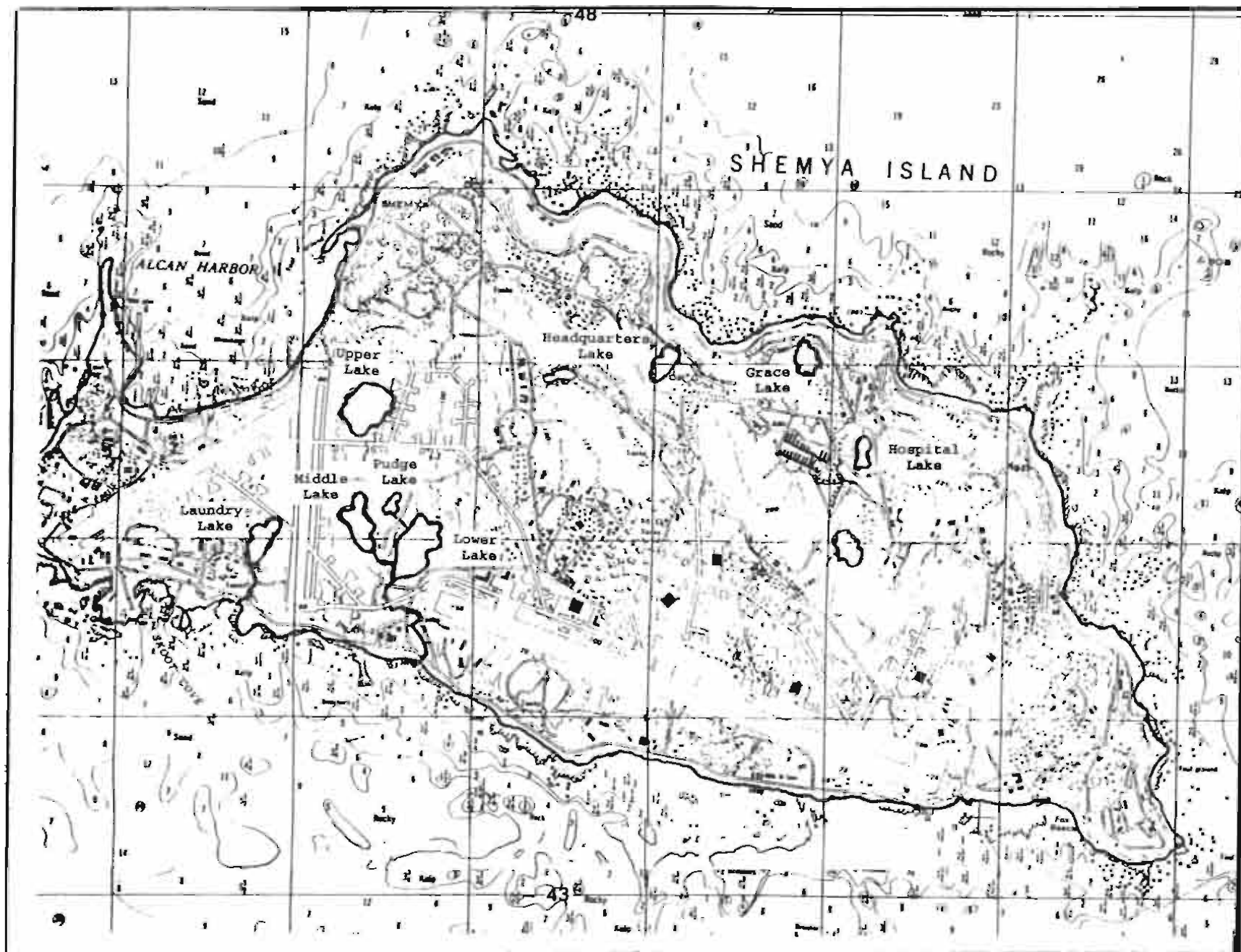


Appendix B7. Kanaga and Tanaga Islands salmon streams

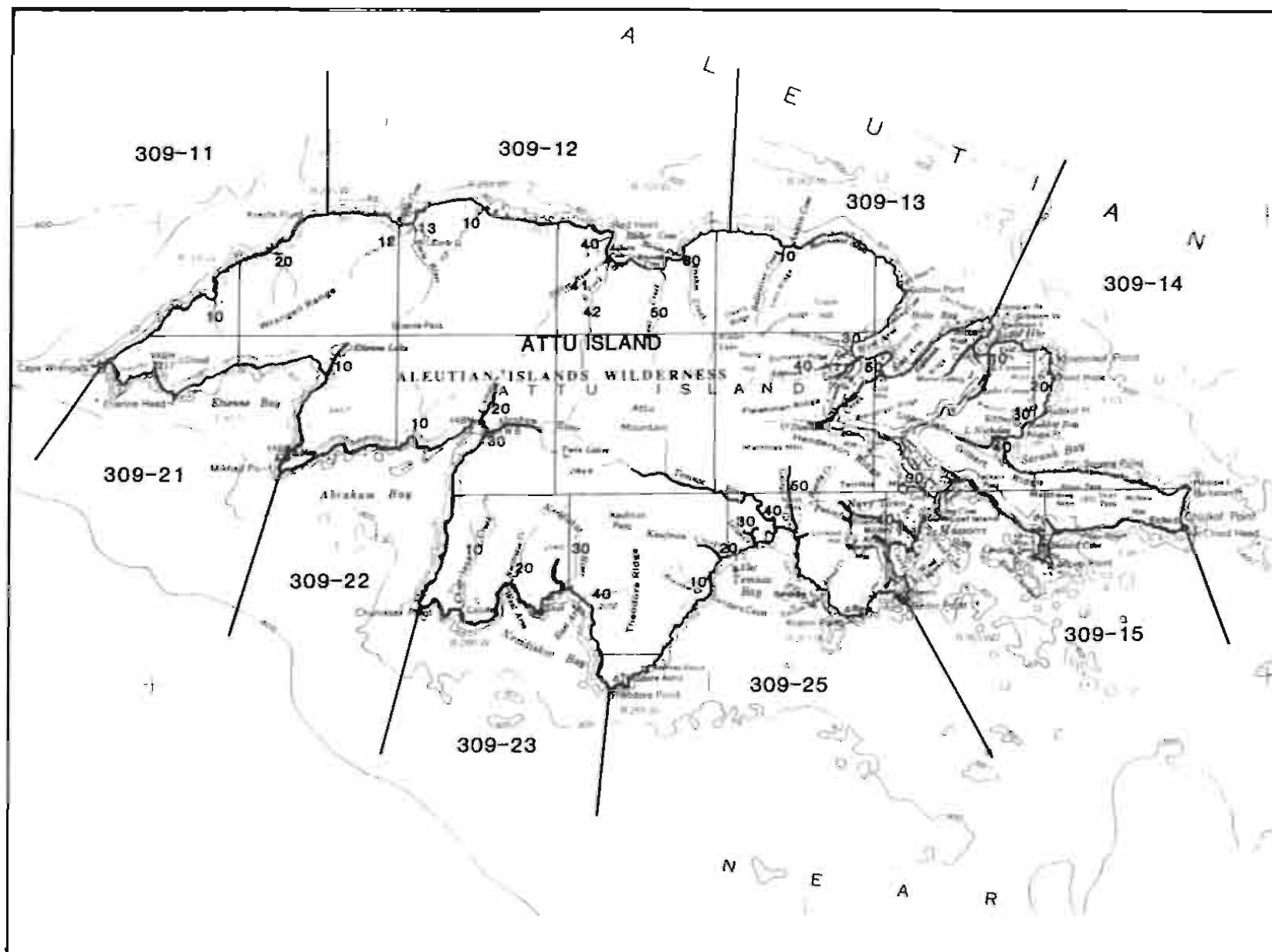
Appendix B 8. Amchitka and Semisopochnoi Islands salmon streams



Appendix B9. Kiska and Agattu Island salmon streams



Appendix B.10. Shemya Island lakes and streams.



Appendix B11. Attu Island salmon streams

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